Introduction of Statistics

The University of Toledo
Mathematics and Statistics
MATH 2600 section _____
3 credit hours

Instructor:	**Term:**
Office Hours:	**Class Location/Times:**
Office Location:	
Office Phone:	**Course Website:**
Email:	

COURSE/CATALOG DESCRIPTION

An introduction to descriptive and inferential statistical methods including point and interval estimation, hypothesis testing and regression.

COURSE OVERVIEW

People around the world have one thing in common- they all want to figure out what's go on. You'd think that amount of information available to everyone today this would be an easy task, but actually, as the amount of information grows, so does our need to understand what it can tell us. Statistics is the study of DATA that provide information about something. This course is to help you make sense of the concepts and methods of Statistics and to turn it into a powerful, effective approach to understanding the world.

STUDENT LEARNING OUTCOMES

Students will be able to summarize **data** by employing appropriate graphical, tabular, and numerical methods for **categorical** and **quantitative data**. Student will be able to critically evaluate **various aspects of a study** (survey, observational and experimental study). Student will be able to compute the elementary **probability a**nd application of **normal distribution**. Students will be able to estimate population parameters (**mean** or **proportions**) using **point** and **interval estimates** and test using **hypotheses test** based on **sampling distribution**. Students will be able to describe the relationships of variables using **contingency table** and **regression**. Students will be able to interpret statistical results in context.

The designed learning outcomes of Intro to Statistics can be found at the end of this syllabus. This course is designated as an Ohio Transfer Module (OTM) Course. Please use the following Ohio Board of Regents (OBOR) link for additional information regarding the required OTM learning outcomes: OTM learning outcomes-Intro Statistics

PREREQUISITES

The prerequisite for this course is Intermediate Algebra. You can demonstrate that you have met this prerequisite in one of 3 ways. (1) ACT math score of 20 or higher (2) Sufficient score on the Math Placement Exam or (3) Minimum grade of C- in Math 1200

TEXTS AND MATERIALS

- **(Required) INTRO STATS COURSE GD BY PAIK (MyStatLab access code included) (ISBN:** 9781323160176)
- Watch the following video for how to register in the MyStatlab for online homework and quiz: Student Process for Registering for a Modified Mastering Course in Blackboard

TECHNOLOGY REQUIREMENTS

Browser Check Page
Students need to have access to a properly functioning computer throughout the semester. The Browser Check Page will enable you to perform a systems check on your browser, and to ensure that your browser settings are compatible with Blackboard, the course management system that hosts this course:
http://www.utdl.edu/utlv/Bb9BrowserCheck/innovation/blackboard/browsercheck.html

Use of Public Computers
If using a public library or other public access computer, please check to ensure that you will have access for the length of time required to complete tasks and tests. A list and schedule for on-campus computer labs is available at http://www.utoledo.edu/it/CS/Lab_hours.html.

UT Virtual Labs
Traditionally, on-campus labs have offered students the use of computer hardware and software they might not otherwise have access to. With UT's Virtual Lab, students can now access virtual machines loaded with all of the software they need to be successful using nothing more than a broadband Internet connection and a web browser. The virtual lab is open 24/7 and 365 days a year at http://www.utoledo.edu/it/VLab/Index.html.

UNIVERSITY POLICES

Policy Statement on Non-Discrimination o**n the basis of Disability (ADA).** The University is an equal opportunity educational institution. Please read The University's Policy Statement on Nondiscrimination on the Basis of Disability Americans with Disability Act Compliance

ACADEMIC ACCOMODATIONS

The University of Toledo is committed to providing equal access to education for all students. If you have a documented disability or you believe you have a disability and would like information regarding academic accommodations/adjustments in this course please contact the Student Disability Services Office

ACADEMIC POLICES

Academic Policies for Undergraduate Students
As a student in my course and enrolled at The University of Toledo you should be familiar with the policies that govern the institution's academic processes, for example, Academic Dishonesty, Enrollment Status, and Grades and Grading. Please read Undergraduate Academic Policies.

Missed Class Policy
Students are expected to attend every class meeting of courses in which they are registered. Please read the Missed Class Policy.

COURSE EXPECTIONS
Examinations must be taken as scheduled on this syllabus and as announced in class. Exceptions will absences, only be made in extenuating circumstances and at the discretion of the instructor. Make-up exams will differ from those given in class, but will cover the same material.

EXTRA CREDIT POLICY:
Extra credit will NOT be given on an individual basis. If there is an extra credit opportunity, it will be open to the entire class and it will not be substantial enough to bump up a letter grade.

GRADING POLICIES
Student work will be assessed as follows. Specific guidelines, grading criteria, and a timeframe for grades and feedback will be provided as each assignment is announced:

	Final Grade
Assignments	150 pts
Quizzes	120 pts
Class Activities	100 pts
Projects (3 projects)	90 pts
EXAM 1	150 pts
EXAM 2	150 pts
FINAL EXAM	300 pts
Total	**1060 pts**

Students are expected to complete and submit all assignments by the due date listed in the Course Schedule. Make-up tests will not be permitted unless arrangements are discussed and approved well before the required due date. Ask questions as soon as possible by email if you do not understand an assignment.

The grading scale for this course is as follows:

950 pts over	A	770 - 799 pts	C+	600 - 629 pts	D-
900 - 949 pts	A-	730 - 769 pts	C	less 600 pts	F
860 - 899 pts	B+	700 - 729 pts	C-		
830 - 859 pts	B	670 - 699 pts	D+		
800 - 829 pts	B-	630 - 669 pts	D		

ASSIGNMENTS

Online homework will be assigned and submitted via BlackBoard using MyStatLab. Each assignment will have a due date. **Late homeworks will be accepted with 30% OFF**. The final submission is the start of the final exam week.

QUIZZES

Online Quiz will be assigned and submitted via BlackBoard using MyStatLab. Each quiz will have a due date. The material on the quizzes will be very similar to the online homework problems and examples in the lecture notes. **Late quizzes will be accepted with 30% OFF**. The final submission is the start of the final exam week. Furthermore, students are given unlimited attempts for homework and quizzes. In other words, students have the ability of earning 100% on all online HW and quizzes, so take advantage of this.

PROJECTS

The purpose of projects is to give you an opportunity to work on a data analysis using technology (StatCrunch or other computer packages). Written projects must be typed (single-spaced, 12-point font) and included graphs should be done on the computer using Statcrunch. Students need to submit projects by the designed due dates via Blackboard**. Late projects will be accepted with 30% OFF**. Learn more at Submit Projects in Blackboard.

EXAMS

Each of these three exams will be proctored on-campus at the dates and times below. The classroom for each exam is TBA.

o   Midterm #1 [150 pts]:   TBA   (F) at class room
o   Midterm #2 [150 pts]:   TBA   (F) at class room
o   FINAL EXAM [300 pts]:   TBA   (T) at class room

COMMUNICATION GUIDELINES

Email:
Students are expected to check their UT email account frequently for important course information. This class is being taught for you, so if you are having trouble understanding any aspect of it, please let me know. I am here to help, and will do my best to respond to email within 24 to 48 hours.

Netiquette:
It is important to be courteous and civil when communicating with others. Students taking online courses are subject to the communication regulations outlined in the Student Handbook. To ensure your success when communicating online, take time to familiarize yourself with the "dos" and "don'ts" of Internet etiquette: **http://www.albion.com/netiquette**

TECHNICAL SUPPORT

If you encounter technical difficulties with Blackboard, please contact the UT Online Help Desk at (419) 530-8835 or utdl@utoledo.edu. The Help Desk offers extended hours in the evenings and on weekends to assist students with technical problems. When calling after hours, leave a detailed message, including your Rocket Number and phone number, and an Online Learning staff member will respond on the next business day. The UT Online Help Desk website is available at: http://www.utoledo.edu/dl/helpdesk/index.html

Technical questions related to on-campus Internet access, virtual labs, hardware, software, personal website hosting, and UTAD account management can be directed to UT's IT Help Desk at (419) 530-2400 or ithelpdesk@utoledo.edu. The IT Help Desk website is available at http://www.utoledo.edu/it/CS/HelpDesk.html.

LEARNER SUPPORT
The University of Toledo offers a wide range of academic and student support services that can help you succeed:

eTutoring Services
The Ohio eTutoring Collaborative, in partnership with The University of Toledo, now provides online tutoring support for all UT students. eTutoring Services are offered in a wide array of subjects, including Writing, Math, Calculus, Statistics, Accounting, Biology, Chemistry, and Anatomy and Physiology.
Learn more at: https://www.etutoring.org/login.cfm?institutionid=232&returnPage

eLibrary Services Portal
The eLibrary is a customized gateway to UT Libraries for online students. It was designed to help you locate the best online library resources without leaving Blackboard.
Learn more at: http://www.utoledo.edu/dl/students/elibrary.html

Counseling Center
The Counseling Center is the university's primary facility for personal counseling, psychotherapy, and psychological outreach and consultation services. The Counseling Center staff provide counseling (individual and group), mental health and wellness programming, and crisis intervention services to help students cope with the demands of college and to facilitate the development of life adjustment strategies.
Learn more at: http://www.utoledo.edu/studentaffairs/counseling/

IMPORTANT DATES:
Last Day to **ADD/DROP** classes:
Last Day to **WITHDRAW** is:

*** Instructors cannot withdraw students from classes. It is the student's responsibility to withdraw from the course on or before the deadline listed above. If you fail to do so, then you will receive a letter grade for this class at the end of the semester.*

WEEK	DATES	TOPIC	LEARNING OUTCOME	ASSEEMENT
1		Chapter 1 (Paik's note) **DATA**	• Distinguish between descriptive and inferential Statistics. • Identify population, sample, parameter and statistic in a given situation. • Identify individuals and variables in a given situation. • Categorize type of variable. • Explain the big picture of statistics.	**By Sunday at 11:59 PM:** Complete Quiz 1 over chapter 1 at MyStatLab (10pts)
2		Chapter 2 (Paik's note) **Categorical Data**	• Use STATCRUNCH to make and interpret a frequency table or a contingency table for a categorical variable. • Use STATCRUNCH to make and interpret a bar chart or a pie chart. • Report a summary for a categorical variable through appropriate tables and graphs in a given context.	**By Sunday at 11:59 PM:** Complete Quiz 2 over chapter 2 at MyStatLab (10pts)
3		Chapter 3 (Paik's note) **Quantitative Data**	• Describe a quantitative variable with a histogram, a stem-and-leaf plot, a dot plot or a box plot in 4 features: Shape, center, spread and unusual feature. • Summarize the center of a distribution by the mean or median and know when it is best to use. • Summarize the spread of a distribution by the standard deviation or interquartile range and know when it is best to use. • Use STATCRUNCH to make summary statistics and graphs for a quantitative variable. • Compare several groups with boxplots. • Report a summary for a quantitative variable through appropriate numerical measures and graphs in a given context.	**By Sunday at 11:59 PM:** Complete Quiz 3 over chapter 3 at MyStatLab (10pts) Complete Homework 1 over chapter 1 & 2 at MyStatLab (25pts)
4		Chapter 4 (Paik's note) **Normal Distribution**	• Compute and interpret the z-score of an observation. • Compute a percentile, proportion, percentage or probability of interest by finding area under the standard normal distribution using Z-table (Normal calculation). • Find a corresponding value given a percentile, proportion or probability (Backward calculation). • Judge whether a value is extreme by basing on the 68-95-99.7 rule or a normal calculation. • Use STATCRUNCH to evaluate the normality of data (the Normal model) by going through a histogram and a normal probability plot. • Recognize why derived information from a normal calculation can be misleading if the distribution is not Normal.	**By Sunday at 11:59 PM:** Complete Quiz 4 over chapter 4 at MyStatLab (10pts) Submit PROJECT ONE at Project in Blackboard (30pts)
5		Chapter 5.1 and 5.2 (Paik's note) **Correlation**	• Describe the relationship between two quantitative variables on scatterplot in 4 features: direction, form, strength and unusual features. • Identify the explanatory and response variables in a given context. • Use STATCRUNCH to plot bivariate variable, find the correlation; interpret the output.	**By Sunday at 11:59 PM:** Complete Quiz 5 over chapter 5.1 &5.2 at MyStatLab (10pts) Complete Homework 2 over chapter 3 & 4 at MyStatLab (25pts)
	TBD		Exam I : Chapter 1 – Chapter 5.2	

6		Chapter 5 (Paik's note) **Regression**	- Use STATCRUNCH to fit a linear regression line with residual plots; interpret the output. - Interpret a regression slope and intercept appropriately in the context. - Find a predicted value found by substituting the x-value in the regression equation, while being careful of extrapolation. - Report and interpret r-square, which reports the fraction of the variation of y accounted for by the linear model. - Identify unusual and influential points by a scatter plot, residuals and leverage. - Evaluate the validity of statements with information gleaned from a scatterplot, a residual plot, r-square, and outliers. - Report a non-technical summarization for the relationship between variables in words and numbers. Be sure to use the names of the variables and their units.	**By Sunday at 11:59 PM:** Complete Quiz 6 over chapter 5 at MyStatLab (10pts)
7		Chapter 6 (Paik's note) **Various aspects of a study**	- Examine a sample of the population by the choice of the sample and the sample size. - Draw a simple random sample using a table or random digits or a software program. - Evaluate what sampling technique is used and whether it provides a representative sample that yields valid results. - Express the differences among observational studies, experiments and surveys. - Evaluate the validity of statements about the nature of statistical thinking, including the concepts of causation, sample size, experimentation, and subjectivity.	**By Sunday at 11:59 PM:** Complete Homework 3 over chapter 5 at MyStatLab (25pts)
8		Chapter 7 (Paik's note) **Probability**	- Explain "the law of large numbers" and that the common understanding of "the Law of Averages" is false. - Calculate basic probabilities using empirical, theoretical, and subjective probabilities. - Interpret a probability value and understand the possible range of values is from 0 to 1. - Calculate probability for the "or" compound event using the addition rule. - Apply the addition rule correctly by identifying whether the events are disjoint or not. - Calculate probability for the "and" compound event using the multiplication rule. - Apply the multiplication rule correctly by identifying whether the events are independent or dependent events. - Calculate conditional probability and the probability of "at least one".	**By Sunday at 11:59 PM:** Complete Quiz 7 over chapter 7 at MyStatLab (10pts) Submit PROJECT TWO at Project in Blackboard (30pts)
9			- State the sampling distributions arise because samples vary. - Distinguish the difference between the population distribution and the sampling distribution.	**By Sunday at 11:59 PM:** Complete Quiz 8 over chapter 8 at MyStatLab (10pts)

9		Chapter 8 (Paik's note) **Sampling Distribution**	• Construct a histogram showing a sampling distribution of a statistic (mean or proportion) by means of a class project. • Interpret the mean of a sampling distribution of a statistic (mean or proportion) • Interpret the standard deviation of a sampling distribution of a statistic (mean or proportion) • Describe the shape of a sampling distribution depending on the size of the sample. • State the Central Limit Theorem (CLT) tells the sampling distribution of the sample means (or proportion) follows a normal if sufficiently large sample size and sample randomly selected, regardless of the population distribution. • Determine whether the sampling distribution of a mean is approximately normal by the random sampling, sample size or the population distribution.	
10		Chapter 9.1 (Paik's note) **Point and Interval estimate for mean**	• Identify the population mean and standard deviation in a given situation. • Explain the difference between point estimates and confidence intervals for estimating a population parameter. • Compute a critical value given the level of confidence using z-table. • Construct a z-based confidence interval for population mean when sigma is known.	**By Sunday at 11:59 PM:** Complete Homework 4 over chapter 6,7 & 8 at MyStatLab (25pts)
	TBD		Exam II : Chapter 5 – Chapter 8	
11		Chapter 9.1 (Paik's note)	• Explain in context a confidence interval by clearly stating the confidence level. • Determine the appropriate sample size for estimating a mean given a specific margin of error and confidence level. • Evaluate the validity of a confidence interval with the random sampling and the normality of sampling distribution. • Use STATCRUNCH to construct a confidence interval; interpret the output.	**By Sunday at 11:59 PM:** Complete Quiz 9 over chapter 9.1 at MyStatLab (10pts)
12		Chapter 9.2 (Paik's note) **Hypotheses test for mean**	• Identify the population mean and standard deviation in a given situation. • Formulate a null and alternative hypothesis in symbols and words for problems involving the population mean. • Explain the process underlying hypothesis z-test. • Interpret a p-value in the context for a given set of hypotheses. • Make a nontechnical conclusion with respect to the claim in alternative hypothesis in the context. • Evaluate the validity of a hypothesis z-test with the random sampling and the normality of sampling distribution of a mean. • Compare statistical and practical significance. • Use STATCRUNCH to perform a z-based hypothesis test on one mean and interpret the results.	**By Sunday at 11:59 PM:** Complete Quiz 10 over chapter 9.2 at MyStatLab (10pts)

13		Chapter 10 (Paik's note) **Interval estimate and Hypotheses test for mean**	• Identify the population mean and standard deviation in a given situation. • Determine which z-table or t-table is used for inference in a given situation. • Compute a critical value given the level of confidence using t-table. • Construct a t-based confidence interval for population mean when sigma is unknown. • Explain the process underlying hypothesis t-test. • Interpret a p-value in the context for a given set of hypotheses. • Make a nontechnical conclusion with respect to the claim in alternative hypothesis in the context. • Evaluate the validity of a t-based confidence interval and hypothesis test for a mean with the random sampling and the normality of sampling distribution. • Use STATCRUNCH to perform a t-based confidence and hypothesis test on one mean; interpret the results.	**By Sunday at 11:59 PM:** Complete Quiz 11 over chapter 10 at MyStatLab (10pts)
14		Chapter 11 (Paik's note) **Interval estimate and Hypotheses test for proportion**	• Identify the population proportion in a given situation. • Construct a z-based confidence interval for population proportion. • Formulate a null and alternative hypothesis in symbols and words for problems involving the population proportion. • Interpret a p-value in the context for a given set of hypotheses. • Make a nontechnical conclusion with respect to the claim in alternative hypothesis in the context. • Evaluate the validity of a z-based confidence interval and hypothesis test for a proportion with the random sampling and the normality of sampling distribution. • Determine the appropriate sample size for estimating a proportion given a specific margin of error and confidence level. • Use STATCRUNCH to perform a z-based confidence interval hypothesis test on one proportion; interpret the results.	**By Sunday at 11:59 PM:** Complete Homework 5 over chapter 9 & 10 at MyStatLab (30pts) Submit PROJECT THREE at Project in Blackboard (30pts)
15		Review	Read and view the content posted in Blackboard	**By Sunday at 11:59 PM:** Complete Quiz 12 over chapter 11 at MyStatLab (10pts) Complete Homework 6 over chapter 11 at MyStatLab (25pts)
	TBD		FINAL EXAM : Chapter 1 – Chapter 11	