Applied Statistics – Spring 2020

67-201-006	MWF	1:50 – 2:50 PM	Swart 14
67-202-007	MWF	3:00 – 4:00 PM	Swart 14

Catalog Description: An introduction to applied statistics using a statistical computing package such as MINITAB. Topics include: Descriptive statistics, elementary probability, discrete and continuous distributions, interval and point estimation, hypothesis testing, regression and correlation.

Course Description: This course is an introduction to applied statistics, which is the science of gathering and analyzing data. The topics we will cover include: descriptive statistics, both graphical and numerical, simple regression and correlation, elementary probability, sampling distributions, and the fundamentals of statistical inference, including confidence intervals and hypothesis testing. A student who has successfully learned this material will be prepared to interpret data from whatever field they are studying.

Prerequisite: PBIS 187, 188 or 189 or Mathematics 104 or 108 with a grade of C or better.

Learning Objective: This course is an introduction to applied statistics, which is the science of gathering and analyzing data. Topics covered include descriptive statistics, both graphical and numerical, simple regression and correlation, elementary probability, sampling distributions, and the fundamentals of statistical inference, including confidence intervals and hypothesis testing. A student who has successfully learned this material will be prepared to interpret data from whatever field they are studying.

Upon successful completion of the course, students are expected to have the ability to:

- Describe and understand graphical displays of data.
- Describe and understand numerical summaries of data.
- Calculate with technology areas under the normal curve.
- Understand and calculate with technology correlations and regression equations.
- Understand and describe different sampling schemes, and understand the principles of experimentation to establish cause and effect.
- Describe and calculate probabilities using the basic rules.
- Understand and create elaborate probability calculations using trees and Venn diagrams.

- Develop the reasoning behind sampling distributions including the Central Limit Theorem.
- Understand and calculate the formulas for confidence intervals.
- Understand and calculate the formulas for hypothesis tests.
- Compare and contrast the various t-tests, one- and two-sample, matched pairs, and z-tests for proportions.

Liberal Arts Education: MATH 201 is part of the University Studies Program (USP) as an EXPLORE course in the NATURE category. The Explore classes are designed to provide a solid foundation for the rest of your education here, no matter your chosen field of study. For further information, visit the University Studies Program website at uwosh.edu/usp.

Liberal Arts Education empowers individuals and prepares them to deal with complexity, diversity, and change. It provides students with broad knowledge of the wider world (e.g. – science, culture, and society) as well as in-depth study in a specific area of interest. A liberal education helps students develop a sense of social responsibility, as well as strong and transferable intellectual and practical skills such as communication, analytical and problem solving skills, and a demonstrated ability to apply knowledge and skills in real world settings.

Someone educated in the Liberal arts is a responsible member of society, is engaged in the community, and is able to understand the issues of the day. They are problem solvers, and have learned *how* to learn new skills and knowledge. Specifically, the field of Statistics is crucial to a Liberal Arts education, as data is collected and analyzed in a variety of careers. Being able to gather, analyze, and draw conclusions from data is a crucial component of an educated member of a global society.

Instructor: Michael (Mike) Skowronski
Office: Swart 233
Phone: 424 - 7347
Email: skowrons@uwosh.edu

Office Hours:
M: 10:20 – 11:20
T: 1:50 – 2:50
W: 10:20 – 11:20
R: 3:00 – 4:00
F: 10:20 – 11:20
Others by appointment.

Text: *Introduction to the Practice of Statistics* (without access code), Ninth Edition, by Moore/McCabe/Craig. An earlier edition would probably be adequate; however, the page numbers will likely be different.

Calculator: TI-83, TI-83 Plus, or TI-84 Plus graphing calculator by Texas Instruments g is **required.** Bring your calculator to class every day. Other graphing calculators may cause you difficulty as I may be unable to accommodate you.

Attendance:

It is important to attend class regularly. It is your responsibility to obtain the notes when you were absent. If you know of an absence in advance, please contact me as soon as possible. **If the reason for your absence cannot be documented or excused, you will receive a grade of zero for any quiz or activity that is missed.**

Course Topics:

CHAPTER 1: Looking at Data – Distributions
1.1 – Data
1.2 – Displaying Distributions with Graphs
1.3 – Displaying Distributions with Numbers
1.4 – Density Curves and Normal Distributions

CHAPTER 2: Looking at Data – Relationships
2.1 – Relationships
2.2 – Scatterplots
2.3 – Correlation
2.4 – Least-Squares Regression
2.5 – Cautions about Correlation and Regression
2.6 – Data Analysis for Two-Way Tables
2.7 – The Question of Causation

CHAPTER 3: Producing Data
3.1 – Sources of Data
3.2 – Design of Experiments
3.3 – Sampling Design
3.4 – Ethics

CHAPTER 4: Probability: The Study of Randomness
4.1 – Randomness
4.2 – Probability Models
4.3 – Random Variables
4.4 – Means and Variances of Random Variables
4.5 – General Probability Rules

CHAPTER 5: Sampling Distributions
5.1 – Toward Statistical Inference
5.2 – The Sampling Distributions of a Sample Mean
5.3 - Sampling Distributions for Counts and Proportions

CHAPTER 6: Introduction to Inference

6.1 – Estimating with Confidence
6.2 – Tests of Significance
6.3 – Use and Abuse of Tests
6.4 – Power and Inference as a Decision

CHAPTER 7: Inference for Means
7.1 – Inference for the Mean of a Population
7.2 – Comparing Two Means

CHAPTER 8: Inference for Proportions
8.1 – Inference for a Single Proportion
8.2 – Comparing Two Proportions

Grading Scale:	A:	93 – 100	A-:	90 – 92
	B+:	87 – 89	B:	83 – 86
	B-:	80 – 82	C+:	77 – 79
	C:	70 – 76	D:	60 – 69
	F:	Below 60		

Grading:	Exams (3)	75% (25% each)
	Homework	15%
	In-Class	10%

Exams:

Exam 1:	**FRIDAY, MARCH 6**	CHAPTERS 1 & 2
Exam 2:	**WEDNESDAY, APRIL 8**	CHAPTERS 3, 4, & 5
Exam 3:	**WEDNESDAY, MAY 13**	CHAPTERS 6, 7, & 8

Homework:

There will be several homework assignments. These will be paper and pencil (pen) assignments. I will be providing a packet of all the homework assignments and also posting the document on Canvas. These homework assignments will be due at the beginning of class on their due date. **Late homework will only be accepted if you communicate with me in advance as to the circumstances of why the homework cannot be completed in a timely manner.**

Resources for Success:

Office Hours: See this syllabus. I am available at other times. **Just ask!**

Early Alert: Early Alert is a program that provides you with an early report of your progress in classes. I participate in this. For the spring semester, Early Alert begins March 4th and concludes on March 8th. Early Alert will identify if you have issues with academic performance and / or attendance issues. An email will be sent to you identifying resources and steps you can take to help you improve. I post grades on Canvas so you can monitor your course progress. I believe you can set up with Canvas to receive alerts when grades are posted. You will receive an email during the 5th week of classes. I choose to send an email even if you have no academic or attendance issues. Please read this email carefully.

Writing Center: The Writing center helps students of all ability levels improve their writing. Trained peer consultants help writers understand and assignment, envision possibilities for a draft, and improve their writing process. They even help writers learn to identify their own proofreading errors. Students can make a free appointment or drop in to see whether a consultant is available. For more information, visit their website (www.uwosh.edu/wcenter), call 920-424-1152, email wcenter@uwosh.edu, or visit them in Suite 102 of the Student Success Center.

Reading Study Center: The Reading Study Center is an all University service whose mission is to facilitate the development of efficient college-level learning strategies in students of all abilities. The center offers strategies for improved textbook study, time management, note taking, test preparation, and test taking. Foer more information, email readingstudy@uwosh.edu, view the website (www.uwosh.edu/readingstudycenter), or visit them in Nursing Ed Room 201, or call 920-424-1031.

Polk Library/Information Literacy: Polk Library offers many professional librarians who can help you find library resources for your research. Specifically, Ted Mulvey, the Information Literacy Librarian, is available to assist you as you access, evaluate, and use information in USP classes. Phone: 920-424-7329, email: mulvey@uwosh.edu. You may also set up a research advisory session with a librarian at: rap@uwosh.edu.

Center for Academic Resources: The Center for Academic Resources (CAR) provides free, confidential tutoring for students in many undergraduate classes on campus. CAR is located in the located in the Student Success Center, Suite 102. Check out the Tutor List page at www.uwosh.edu/car for a list of tutors. If your course is not listed, click on a link to request one, stop by SSC 102, or call 920-424-2290. To schedule a tutoring session, simply email the tutor, let him/her know what class you are seeking assistance in, and schedule a time to meet.

ACCOMMODATIONS FOR DISABILITIES:

It is the University's policy to provide, on a flexible and individual basis, reasonable accommodations to students who have documented disabilities that may affect their ability to participate in course activities or to meet course requirements. Students with disabilities must be registered with Services for Students with Disabilities or Project Success and receive an Accommodation Recommendation form to receive accommodations. Services for Students with Disabilities are located in 125 Dempsey Hall.

It is the policy and practice of UW Oshkosh to create inclusive learning environments. If there are aspects of the instruction or design of this course that result in barriers to your inclusion, please notify me as soon as possible. You are also welcome to contact Services for Students with Disabilities at 920-424-3100 or dean1@uwosh.edu. For more information, visit the Services for Students with Disabilities website at http://www.uwosh.edu/deanofstudents/disability-services.

ACADEMIC MISCONDUCT:

As a UW Oshkosh student, it is your responsibility to be informed about what constitutes academic misconduct, how to avoid it and what happens if you decide to engage in it.

Examples of academic misconduct include (but are not limited to):

- plagiarism (turning in work of another person and not giving them credit),
- stealing an exam or course materials,
- copying another student's homework, paper, exam
- cheating on an exam (copying from another student, turning in an exam for re-grading after making changes, working on an exam after the designated time allowance)
- falsifying academic documents

https://www.uwosh.edu/deanofstudents/university-policies-procedures/academic-misconduct

"Students are advised to see the following URL for disclosures about essential consumer protection items required by the Students Right to Know Act of 1990:

https://uwosh.edu/financialaid/consumer-information/

FINAL REMARKS:

I look forward to meeting and working with all of you. I encourage you to work with one another and to utilize all the **FREE** resources available to you (CAR, my office hours, and each other). I also suggest that you check your email and Canvas periodically as I use these resources to post announcements and to record grades.

I intend to treat all of you fairly and with respect. You need to do the same. All smart phones should be in silent mode or off while class is in session. If your phone needs to be kept on for an emergency, then please leave the room to respond.

DO NOT hesitate to schedule an appointment if my office hours conflict with your availability. I live very close to the University and usually come in on days off or well before my first class. Feel free to stop by, or email if you have any concerns.
I have met students in the evening and on weekends in my office or Reeve Union if they had to miss class for a family emergency, illness, or a University commitment. If you are reluctant to ask questions in class you can send an email or stop by my office asking me to solve a specific problem at the beginning of class. **Your success is my top priority!**