

# Elementary Statistical Methods

Fall 2020

## Syllabus

### Part 1: Course Information

#### Instructor Information

Instructor: Tongtong Zhang  
Office: B152 Science Building  
Office Hours: By appointment  
E-mail: [tzhang@uwsp.edu](mailto:tzhang@uwsp.edu)  
Credits: 4  
Prerequisite: Math 100 and 101 or equivalent

#### Textbook & Course Materials

Required Text:  
Introduction to the practice of statistics by Moore, McCabe and Craig [ISBN:978-1-4641-3338-1].

Some statistics text may use different (but equivalent) notations and formulas from what are used in this course. Course handouts and video lectures will also explain what you need to know to understand the assignments.

#### Course Requirements

Minimum recommended computer and internet configurations for online courses can be found [here](#).

#### Course Structure

This course will be delivered entirely online through the course management system CANVAS. You will use your UWSP account to login to the course from the [CANVAS Login Page](#). If you have not activated your UWSP account, please visit the [Manage Your Account](#) page to do so. In CANVAS, you will access online lessons, course materials, and resources.

#### CANVAS Access

This course will be delivered fully online through a course management system called CANVAS. To access this course on CANVAS you will need access to the Internet and a supported Web browser (Internet Explorer, Chrome, Firefox, Safari). To ensure that you are using the recommended personal computer configurations, please refer to the [CANVAS student support](#).

#### Technical Assistance

If you need technical assistance at any time during the course or to report a problem with CANVAS you can:

- Visit with a [Student Technology Tutor](#)
- Seek assistance from the [HELPDesk](#)

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Important Note: This syllabus, along with course assignments and due dates, are subject to change. It is the student's responsibility to check CANVAS for corrections or updates to the syllabus. Any changes will be clearly noted in a course announcement or through email.

### Part 2: Course Learning Outcomes

The course introduces the fundamental concepts of statistics in sociology, education, psychology, nursing, business and general research data analysis. These concepts are often considered basic tools for investigating undergraduate and graduate research questions. No previous knowledge beyond fundamental arithmetic is assumed. General course objectives include:

- Identify the variables in a data set.
- Identify the values of a variable
- Analyze the distribution of a categorical variable using a bar graph/pie chart.
- Analyze the distribution of a quantitative variable using a stem plot/histogram.
- Identify the shape, center, and spread of the distribution of a quantitative variable.
- Describe the center of a distribution by using the mean/median.
- Describe the spread of a distribution by using quartiles/five number summary.
- Identify outliers by using the 1.5XIQR rule.
- Be able to sketch a Normal distribution for any given mean and standard deviation.
- Be able to apply the 68-95-99.7 rule to find proportions of observations within 1, 2, and 3 standard deviations of mean for any Normal distribution.
- Be able to compute areas under a Normal curve using table A.
- Be able to perform inverse normal calculations to find values of a Normal variable corresponding to various areas.
- Be able to extent to which the distribution of a set of data can be approximated by a Normal distribution.
- Describe a sample space from a description of a random phenomenon.
- Apply the five probability rules.
- Describe the probability distribution of a discrete random variable.
- Use the distribution of a discrete random variable to calculate probabilities of events.
- Identify population, population mean and population standard deviation.
- Identify a statistical as pertaining to either a sample or a population.
- Be able to calculate sample distribution.
- Be able to determine when the sampling distribution of X can be modeled using the binomial distribution.
- Be able to calculate the mean and standard deviation of X when it has the  $B(n, p)$  distribution.
- Be able to read a binomial table.
- Identify the key characteristics of a data set to be used to explore a relationship between two variables.
- Categorize variables as response variables or explanatory variables.
- Be able to make a scatterplot to examine a relationship between two quantitative variables.
- Describe the overall pattern in a scatterplot and any striking deviations from that pattern.

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- Use a scatterplot to describe the form, direction and strength of a relationship.
- Use a scatterplot to identify outliers.
- Identify a linear pattern in a scatterplot.
- Understand the definition of the least-squares regression equation.
- Be able to calculate the residual value.
- Describe a level C confidence interval for a population parameter in terms of an estimate and its margin of error.
- Explain how the margin of error changes with a change in the confidence level C.
- Determine the sample size needed to obtain a specified margin of error for a level C confidence interval for  $\mu$ .
- Formulate the null and alternative hypotheses of a significance test.
- Describe a common form for the test statistic in terms of the parameter estimate, its standard deviation, and the hypothesized value.
- Define what a P-value is and explain whether a small P-value provides evidence for or against the null hypothesis.
- Write a conclusion from test of significance based on the test's P-value and significance level  $\alpha$ .
- Perform a one-sample t significance test and summarize the results.
- Describe a level C confidence interval for a population parameter in terms of an estimate and its margin of error.
- Define what a P-value is and explain whether a small P-value provides evidence for or against the null hypothesis.
- Identify the sample proportion, and sample size, and the count for a single proportion. Use the information to estimate the population proportion.
- Describe the relationship between the population proportion and the sample proportion.
- Identify the standard error for a sample proportion and the margin of error for confidence level C.
- Apply the large sample significance test to test a null hypothesis about the population proportion.
- Determine the sample size needed for a desired margin of error.
- Two way table

Part 3: Topic Outline/Schedule

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Test 1 and 2 will post in Canvas.

Final Exam-Week of Dec15th, 2019 (Time will be announced through email and posted in Canvas).

## Part 4: Grading Policy

### Grading Policy

\*\*\*Homework 25% \*\*\*(check "Assignment" in Canvas for due date of homework)

\*\*\*Exams 40%(each test 20%)\*\*(check "quizzes" in Canvas for detail date)

\*\*\*Final exam 25%\*\*\*

\*\*\*Statistics project 10%\*\*\*

Students are required to complete a project using correlation/regression or single sample z-test, t test, basic graph or analysis method. Students shall decide which methods they wish to use. Students are required use two or more method to analyze data. Students should identify the methods used in the project description. The project should relate to the students graduate program interests-thesis, project, experiment, etc. It should involve the use of real data-data survey/questionnaire for the student's thesis, students can do an analysis of the results. Students may also use secondary data (data someone else has collected) and analyze it differently from how it was originally analyzed. Data size should be more then 10. The project should include an introduction, description of methodology, discussion, summary/conclusions. The proposal should identify at least two variables the student wishes to study, the data source(s), and the statistical method used in the analysis. Projects will be uploaded to a Assignment in Canvas.

### Grading Scale

$92.5 \leq "A" \leq 100\%$	$89.5 \leq "A-" < 92.4$	$86.5 \leq "B+" < 89.4$
$82.5 \leq "B" < 86.4$	$79.5 \leq "B-" < 82.4$	$76.5 \leq "C+" < 79.4$
$72.5 \leq "C" < 76.5$	$69.5 \leq "C-" < 72.4$	$64.5 \leq "D+" < 69.4$
$59.5 \leq "D" < 64.4$	$0\% \leq "F" < 59.4$	

### Late Work Policy

Late work may be accepted up to 24 hours after the due date, late work will be awarded a maximum of 50% credit.

### Viewing Grades in CANVAS

Points you receive for graded activities will be posted to the CANVAS Grade Book. Click on the Grades link to view your points.

Your instructor will update the online grades each time a grading session has been complete—typically 4 days following the completion of an activity. You will see a visual indication of new grades posted on your CANVAS home page under the link to this course.

### Part 5: Course Policies

#### Netiquette Guidelines

Netiquette is a set of rules for behaving properly online. Your instructor and fellow students wish to foster a safe online learning environment. All opinions and experiences, no matter how different or controversial they may be perceived, must be respected in the tolerant spirit of academic discourse. You are encouraged to comment, question, or critique an idea but you are not to attack an individual. Working as a community of learners, we can build a polite and respectful course community.

The following netiquette tips will enhance the learning experience for everyone in the course:

- Do not dominate any discussion.
- Give other students the opportunity to join in the discussion.
- Do not use offensive language. Present ideas appropriately.
- Be cautious in using Internet language. For example, do not capitalize all letters since this suggests shouting.
- Popular emoticons such as ☺ or / can be helpful to convey your tone but do not overdo or overuse them.
- Avoid using vernacular and/or slang language. This could possibly lead to misinterpretation.
- Never make fun of someone's ability to read or write.
- Share tips with other students.
- Keep an "open-mind" and be willing to express even your minority opinion. Minority opinions have to be respected.
- Think and edit before you push the "Send" button.
- Do not hesitate to ask for feedback.
- Using humor is acceptable

Adapted from:

Mintu-Wimsatt, A., Kernek, C., & Lozada, H. R. (2010). *Netiquette: Make it part of your syllabus*. *Journal of Online Learning and Teaching*, 6(1). Retrieved from [http://jolt.merlot.org/vol6no1/mintu-wimsatt\\_0310.htm](http://jolt.merlot.org/vol6no1/mintu-wimsatt_0310.htm)

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Shea, V. (1994). Netiquette. Albion.com. Retrieved from:  
<http://www.albion.com/netiquette/book/>.

### Participation

Students are expected to participate in all online activities as listed on the course calendar.

### Build Rapport

If you find that you have any trouble keeping up with assignments or other aspects of the course, make sure you let your instructor know as early as possible. As you will find, building rapport and effective relationships are key to becoming an effective professional. Make sure that you are proactive in informing your instructor when difficulties arise during the semester so that we can help you find a solution.

### Complete Assignments

All assignments for this course will be submitted electronically through CANVAS unless otherwise instructed. Assignments must be submitted by the given deadline or special permission must be requested from instructor *before the due date*. Extensions will not be given beyond the next assignment except under extreme circumstances.

All discussion assignments must be completed by the assignment due date and time. Late or missing discussion assignments will affect the student's grade.

### Understand When You May Drop This Course

It is the student's responsibility to understand when they need to consider unenrolling from a course. Refer to the UWSP [AcademicCalendar](#) for dates and deadlines for registration. After this period, a serious and compelling reason is required to drop from the course. Serious and compelling reasons includes: (1) documented and significant change in work hours, leaving student unable to attend class, or (2) documented and severe physical/mental illness/injury to the student or student's family.

### Incomplete Policy

Under emergency/special circumstances, students may petition for an incomplete grade. An incomplete will only be assigned if health or emergency issue.

### Inform Your Instructor of Any Accommodations Needed

If you have a documented disability and verification from the [DisabilityandAssistive TechnologyCenter](#) and wish to discuss academic accommodations, please contact your instructor as soon as possible. It is the student's responsibility to provide documentation of disability to Disability Services and meet with a Disability Services counselor to request special accommodation *before* classes start.

The Disability and Assistive Technology Center is located in 609 Learning Resource Center and can be contacted by phone at (715) 346-3365 (Voice) (715) 346-3362 (TDD only) or via email at [datctr@uwsp.edu](mailto:datctr@uwsp.edu)

### Statement of Policy

UW-Stevens Point will modify academic program requirements as necessary to ensure that they do not discriminate against qualified applicants or students with disabilities. The modifications should not affect the substance of educational programs or compromise academic standards; nor should they intrude upon academic freedom.

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Examinations or other procedures used for evaluating students' academic achievements may be adapted. The results of such evaluation must demonstrate the student's achievement in the academic activity, rather than describe his/her disability.

*If modifications are required due to a disability, please inform the instructor and contact the Disability and Assistive Technology Center in 609 LRC, or (715) 346-3365.*

### Commit to Integrity

As a student in this course (and at this university) you are expected to maintain high degrees of professionalism, commitment to active learning and participation in this class and also integrity in your behavior in and out of the classroom.

UWSP Academic Honesty Policy & Procedures

Student Academic Disciplinary Procedures

UWSP 14.01 Statement of principles

The board of regents, administrators, faculty, academic staff and students of the university of Wisconsin system believe that academic honesty and integrity are fundamental to the mission of higher education and of the university of Wisconsin system. The university has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others' academic endeavors. Students who violate these standards must be confronted and must accept the consequences of their actions.

UWSP 14.03 Academic misconduct subject to disciplinary action.

- (1) Academic misconduct is an act in which a student:
  - (a) Seeks to claim credit for the work or efforts of another without authorization or citation;
  - (b) Uses unauthorized materials or fabricated data in any academic exercise;
  - (c) Forges or falsifies academic documents or records;
  - (d) Intentionally impedes or damages the academic work of others;
  - (e) Engages in conduct aimed at making false representation of a student's academic performance; or
  - (f) Assists other students in any of these acts.

(2) Examples of academic misconduct include, but are not limited to: cheating on an examination; collaborating with others in work to be presented, contrary to the stated rules of the course; submitting a paper or assignment as one's own work when a part or all of the paper or assignment is the work of another; submitting a paper or assignment that contains ideas or research of others without appropriately identifying the sources of those ideas; stealing examinations or course materials; submitting, if contrary to the rules of a course, work previously presented in another course; tampering with the laboratory experiment or computer program of another student; knowingly and intentionally assisting another student in any of the above, including assistance in an arrangement whereby any work, classroom performance, examination or other activity is submitted or performed by a person other than the student under whose name the work is submitted or performed.

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### **Religious Beliefs**

Relief from any academic requirement due to religious beliefs will be accommodated according to UWS 22.03, with notification within the first three weeks of class.