

Course: **STAT 511 Section 002: Statistical Methods I**
CRN: 89559

Instructor: Dr. John Twist
E-mail: jntwist@mail.wvu.edu

Schedule: Tuesday and Thursday, 1:00 pm to 2:15 pm

Location: Hodges Hall, Room 336

Communication: eCampus Announcements will be provided as needed.
Email me. I will typically respond within 24 hours.

Office Hours: Tuesdays 5:00 pm to 8:00 pm, Hodges 109 (Computer Lab)
Thursdays 2:30 to 4:00 pm, Armstrong 210F (Office)

Course Description: PR: Math 126. Probability, random variables, discrete and continuous probability distributions, joint probability distributions, expected value, variance and correlation. The central limit theorem. Point and interval estimation and tests of hypotheses. Chi-square tests, linear regression, correlation and ANOVA.

Required Materials:

JMP Pro Version 16 will be used to graph and analyze data sets for in class examples, for assigned homework problems and during exams.

WHAT? JMP (pronounced "jump") is a statistical software package. Its underlying scripting language can be used to program custom data analyses, but its user-friendly point-and-click interface is sufficient for producing the data analysis summaries needed in our class.

WHERE? You can get JMP at home (e.g., 30-day free trial or academic year rental) or on campus. JMP 30-day free trial link: https://www.jmp.com/en_us/home.html

Renting JMP: WVU students can download and rent "JMP Pro 16" (windows or mac OS) through the WVU Software Licensing Information Center (SLIC). See directions below. SLIC annual licenses run from October 1st - September 30th. The cost to students is \$10 for the quarterly prorated annual license with the following important fall semester caveat. **If a student buys the license in August or September for \$10, they will be given the new license at no additional charge around mid-September. This is roughly 13 months of JMP for \$10.** A student who purchases the license in January would pay a prorated cost of about \$5 for a license ending that September 30th. You may contact SLIC directly with additional questions concerning their policies and procedures.

On Campus: The Statistics Tutoring Center has JMP Pro 16 on its PCs, and students are welcome to use those computers during its hours of operation. Student taking a STAT class may have class in the Hodges 109 or 116, and the PCs in these classrooms also have JMP Pro 16.

HOW? JMP will be demonstrated during class, and you should get in the practice of reproducing JMP output from class. More information and practice with JMP is available from its help menus and online manuals.

HELP:

1. JMP help menus. If you know the basics in JMP, these can be used to quickly answer many questions.
2. JMP online manuals. If you have trouble finding what you need directly through JMP's help menus, the online manuals might be useful. The "Basic Analysis" and "Fitting Linear Models" manuals are most relevant in terms of the statistical models fit in STAT-511, STAT-512, STAT-513, STAT-545. Other, introductory manuals may help with other necessary steps, e.g., reading data into JMP and manipulating a JMP data table.

JMP Pro software can be run on either Windows or Macintosh laptop computers. The software can be purchased through SLIC via this link:

<https://wvu.atlassian.net/servicedesk/customer/portal/5/article/298680653?src=-1896746228>

WVU IT Help Center / WVU ITS / Software Licensing

Software Licensing

The Software Licensing Information Center (SLIC) negotiates discounted software agreements with vendors allowing us to extend these savings to faculty, staff and students. Below is a list of software that is available along with information about eligibility and how to order or download it. SLIC also offers software licenses that can be purchased for personal devices with personal funds.

Once you have reviewed the licensing restrictions and pricing information for the software you want to purchase, complete the [SLIC Software Request form](#) to submit your order.

Available software

<ul style="list-style-type: none">• Adobe• Adobe Creative Cloud• AMOS• Autodesk• Bomgar (BeyondTrust)• ChemDraw• CRM Individual Subscription (Enrollment Management)• EndNote	<ul style="list-style-type: none">• Fonts and Branding• Gaussian• JMP• LinkedIn Learning• Mathematica• MATLAB• Microsoft Audio Conferencing	<ul style="list-style-type: none">• Microsoft Office• Microsoft Windows• Other Microsoft Software• Project Pro for Office 365• Qualtrics Survey Software• SAS• SPSS• Sophos (Virus Protection)• Visio Pro for Office 365
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How to order JMP

WVU Funds: Complete the [SLIC Software Request Form](#) if purchasing this with WVU funds. All licenses for WVU-owned computers need to be paid for with WVU funding. Once your order is submitted, SLIC will send you an invoice for your order along with instructions on how to make payment.

 [Click Here](#)

Personal Funds: Complete the [SLIC Software Request Form](#) if purchasing this with personal funds. All licenses paid for with personal funds need to be installed on personally-owned computer. Orders will be processed by the ITS Service Center in G118 Bennett Tower. You can pay with personal funds over the phone, complete the form and visit Bennett Tower or wait for us to contact you. After payment is received, your software will be sent to your WVU email address, unless you specify otherwise.

Pricing

Personal computer	Annual Fee
JMP for Faculty	\$30
JMP for Students	\$10

[WVU IT Help Center](#) / [WVU ITS](#)

SLIC Software Request

Please review the licensing restrictions and pricing information for the software you want to purchase and submit a request to complete your order.

Summary *

Student Use of [JMP](#) Software for STAT-511 (Statistical Methods I)

Suggested articles

JMP


Staff (Academic Researchers) can purchase this **software** for WVU-owned computers or personal computers. Students can purchase this **software** for their Personal computers using personal funds. If a **student** worker, GA, GRA etc., needs this **software** on a WVU computer...

ICLICKER INFORMATION FOR STUDENTS

iClicker is a **student** response tool that makes it easy for your instructors to track attendance, increase participation, facilitate quizzes and measure performance. **Student** responses are instantly recorded, and grades can be synced with eCampus. You can respond to questions I...

ECAMPUS MOBILE APP FOR STUDENTS

Supported Course Content in the Blackboard App

 The Software Licensing Information Center (SLIC) negotiates discounted software agreements with vendors allowing us to extend these savings to faculty, staff and students. Please go to the [Software Licensing](#) overview article to see a complete list of available software the and associated costs and requirements for each.

Use this form to submit a request to purchase licensing available through SLIC or request assistance.

Select one of the following for your software request. *

- Purchase with WVU funds
- Purchase with personal funds
- Software assistance

Please enter your WVU Department. *

Statistics

Software requested (Subscriptions end on June 30 each fiscal year. Costs are pro-rated quarterly.) *

- SPSS
- AMOS (Not compatible with Mac)
- SAS (Not compatible with Mac)
- JMP

Will you be downloading the software on a computer connected to a wired/wireless WVU network? *

- Yes
- No

eCampus will be the central hub for information, access to homework assignments, PowerPoint lectures in PDF format and communication of grade point totals.

I will use an iClicker course: **STAT-511-002 (John Twist)** to track attendance, take polls during class and request feedback at the end of every lecture. I may use this application in place of one or more paper-based quizzes. The service is free and requires a WIFI connected device (phone, tablet or laptop). Instructions can be found at: <https://macmillan.force.com/iclicker/s/article/How-to-Create-an-iClicker-Student-Account>. I will also post student access information links in an “Announcement” on eCampus.

No internet or cell phone/laptop usage is allowed during quizzes. You will be able to use either JMP Software (cost \$10) or any model standalone calculator that can take square roots for quizzes. The TI-84 Plus calculator provides the statistical functions used in this course. It is an excellent all-around calculator. Cost is between \$60 and \$100, depending on screen preference. See attached tutorial for TI-84 Plus:

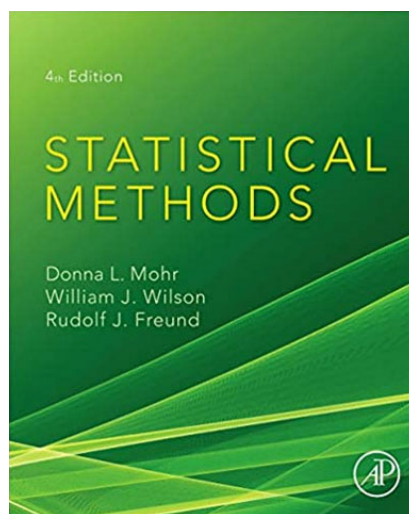
(https://www.openintro.org/go/?id=stat_ti_83_84_guide&referrer=/book/os/index.php)

Note: JMP Pro software will be required to answer most exam questions.

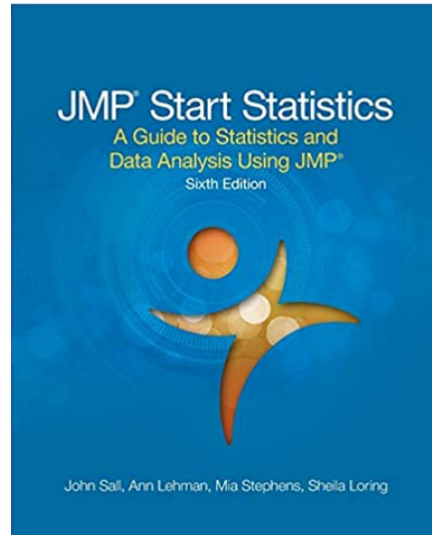
Recommended Texts:

We will cover Chapters 1 through 7 and Chapter 12 in the Mohr textbook and use relevant JMP Pro 16 software teaching scripts and statistical platforms for learning concepts and solving problems in class, on homework problems and during Problems Sections on Exams.

1. **Statistical Methods, 4th Edition, by Mohr, Wilson and Freund (ISBN: 978-0-12-823043-5).** Rental or purchase of the printed text is recommended. Versions of this text have been used for this course for many years. However, the lecture material (PowerPoint slide decks) will contain more detail than provided by this textbook.



2. **JMP Start Statistics: A Guide to Statistics and Data Analysis Using JMP, 6th Edition** by **John Sall, Mia Stephens, Ann Lehman, Sheila Loring (ISBN: 978-1-62960-875-4)**. This book provides excellent coverage of the statistical concepts and serves as a JMP software manual. Highly recommended.



Expected Learning

Outcomes:

Upon successful completion of this course, the student will be able to:

1. Organize data for statistical analysis, construct, interpret, and understand graphical displays of a set of observed data;
2. Calculate, interpret, understand, and identify when to use the sample mean, quartiles, IQR, median, mode, and standard deviation and identify outliers;
3. Compute, understand and interpret the theoretical probability of an event, construct and interpret probability distributions, know how the laws of probability are used to compute probabilities of events;
4. Describe how various probability distributions arise, including binomial, multinomial, negative binomial, geometric, Poisson, uniform, normal, exponential, chi-squared, t , and F , and calculate probabilities using these;
5. Compute and interpret confidence intervals for a population mean, population proportion, population mean difference, difference in two population means, and difference in two population proportions;
6. Perform hypothesis tests for a population mean, population proportion, population mean difference, difference in two population means, and difference in two population proportions;
7. Understand and compute the mean and standard deviation of the sampling distribution of sample means and use the Central Limit Theorem to answer probability questions involving the sample mean;
8. Perform chi-squared goodness of fit, independence, and homogeneity tests;
9. Measure and assess the association between two quantitative variables via the Pearson correlation coefficient;
10. Relate the steps in hypothesis testing to the scientific method;
11. Construct the null and alternative hypotheses;

12. Understand and describe the Type I and Type II errors in the context of a hypothesis test;
13. Perform large- and small-sample hypothesis tests on population parameters, use p-values, interpret the results and state the conclusion of a hypothesis test;
14. Compare three or more sample means using Analysis of Variance;
15. Make inferences concerning the theoretical slope of a linear regression line and determine the accuracy of regression predictions.
16. Have a working knowledge of how to format data to be used with statistical/graphing software packages, specifically JMP Pro software.

We will cover material in Chapters 1 through 7 and Chapter 12 in the Mohr textbook and use relevant JMP Pro 16 software teaching scripts and statistical platforms for learning concepts and solving problems in class.

Evaluation:

1. Two exams worth a total of 650 points. Each exam will have two approximately equally valued parts (multiple choice concept questions and worked problems) given on Tuesday and Thursday class periods. **You can use a two-sided letter size paper with personalized information such as formulas, diagrams and comments (handwritten or printed) for both parts of each exam.**

Exam 1: 275 points (Tentatively September 27th and 29th after Lecture #11)

Exam 2: 375 points (December 13th and December 15th)

2. Eleven homework assignments worth 25 points each with *the lowest score dropped*.
 $10 \times 25 = 250$ points total.
3. Seven quizzes worth 20 points each with *the lowest two scores dropped*. $5 \times 20 = 100$ points total.
4. Bonus Point Opportunities:
 - a) Class attendance via iClicker (2 points per class session, up to 40 points total).
 - b) Two homework assignments (just prior to exams) will have bonus point opportunities (5 points each)
 - c) The last three quizzes will have bonus point opportunities (2 points per quiz).
 - d) Each exam (problems part) will have bonus point opportunities (15 points).
 - e) Student Evaluation of Instructor (SEIC): 5 points for each student if achieve at least 90% class participation.

Grade Assignment:

There are 1000 points possible in this course (not including bonus points). ***I have the discretion to scale grades. This will only be done if the class average of net total points (includes bonus points), is less than 750 points.***

A = 950+ Points	A- = 900-949 Points
B = 850-899 Points	B- = 800-849 Points
C = 750-799 Points	C- = 700-749 Points
D = 600-699 Points	F = 0-599 Points

Tutoring and Homework Assistance:

I will go over lecture material and provide guidance related to homework questions during office hours. I am open to scheduling one hour Zoom meetings upon request.

Link for the tutoring center (Eiesland Hall G29):

- ✓ <https://mathanddata.wvu.edu/students/current-students-impl/math-learning-center-tutors>

Course Schedule:

STAT-511-002, CRN: 89559, Dr. John Twist						
Hodges Hall 336, Tuesday/Thursday 1:00 pm to 2:15 pm						
Date	Day	Lecture	Topic	Homework	Quiz	Exam
18-Aug-22	Thursday	1	Introduction to Statistics and Data Analysis			
23-Aug-22	Tuesday	2		1		
25-Aug-22	Thursday	3	Sample Space, Events, Counting, Probability, Probability Rules, Independence, Bayes' Rule			
30-Aug-22	Tuesday	4		2		
1-Sep-22	Thursday	5	Random Variables, Discrete Distributions, Continuous Probability Distributions, Joint Probability Distributions		1	
6-Sep-22	Tuesday	6		3		
8-Sep-22	Thursday	7	Expected Value, Variance and Covariance, Linear Combinations			
13-Sep-22	Tuesday	8		4		
15-Sep-22	Thursday	9	Discrete Distributions		2	
20-Sep-22	Tuesday	10				
22-Sep-22	Thursday	11		5		
27-Sep-22	Tuesday					Exam 1 (Concepts)
29-Sep-22	Thursday					Exam 1 (Problems)
4-Oct-22	Tuesday	12	Continuous Probability Distributions			
6-Oct-22	Thursday	13		6		
11-Oct-22	Tuesday	14	Sampling Distributions, Central Limit Theorem, t and F Distributions, Q-Q Plots		3	
13-Oct-22	Thursday	15		7		
18-Oct-22	Tuesday	16	Statistical Inference, Estimation Methods, Standard Error, Confidence Interval for Mean, Prediction and Tolerance Intervals		4	
20-Oct-22	Thursday	17				
25-Oct-22	Tuesday	18		8		
27-Oct-22	Thursday	19	CI for Difference in Means, CI for Proportion and Difference in Proportions, Estimating the Ratio of Two Variances		5	
1-Nov-22	Tuesday	20				
3-Nov-22	Thursday	21		9		
8-Nov-22	Tuesday	Election Day: University Closed				
10-Nov-22	Thursday	22	Introduction to Hypothesis Testing, Use of p-values, Hypothesis Test for Mean and Mean Difference, Test for Difference in Means (Pooled and Unpooled Cases)		6	
15-Nov-22	Tuesday	23				
17-Nov-22	Thursday	24		10		
22-Nov-22	Tuesday	Fall Recess: University Closed				
24-Nov-22	Thursday	Fall Recess: University Closed				
29-Nov-22	Tuesday	25	Test for Proportions and Difference in Proportions, Chi-Square Tests: Goodness of Fit, Independence, and Homogeneity		7	
1-Dec-22	Thursday	26				
6-Dec-22	Tuesday	27	ANOVA: Analysis of Variance (One-Way), Correlation and Simple Linear Regression	11		
8-Dec-22	Thursday	28				
13-Dec-22	Tuesday					Exam 2 (Concepts)
15-Dec-22	Thursday					Exam 2 (Problems)

Academic Integrity: The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. For the detailed policy of West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the Student Conduct Code at <http://www.arc.wvu.edu/admissions/integrity.html>

Social Justice: West Virginia University is committed to social justice. I concur with that commitment and expect to maintain a positive learning environment based upon open communication, mutual respect, and non-discrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran's status, religion, sexual orientation, color or national origin.

Disability Services: If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Office of Disability Services (304-293-6700).

Compliance with current WVU policy with regards to Covid-19 restrictions is mandatory.