

# Syllabus

**MATH-505: Statistical Methods I**

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Course updated: June 2018

Session Dates 8/26/19-10/20/19

## Course Description

This applied statistics course presents a variety of statistical topics in the context of real world data. The goal of this course is to demonstrate the broad applicability of advanced statistical techniques. Topics include probability, inferences for one and two sample means, inferences for more than two sample means, inferences for one and two sample proportions, multiple-comparison procedures, and nonparametric methods.

Prerequisite: A bachelor's degree with a Mathematics major or must be state certified (in any state) to teach Mathematics at a secondary school level.

Credit Hours: 3

Prerequisite Courses: None

Prerequisite Skills and Knowledge:

- Candidates who meet program acceptance requirements possess the necessary skills and knowledge for this course.

## Course Outcomes

**Upon completion of this course, you should be able to:**

1. Construct quantitative and qualitative models that describe real world phenomena.
2. Compare various statistical techniques in order to solve problems and make decisions.
3. Analyze the assumptions of various statistical procedures.
4. Apply the descriptive procedures and inferential statistical tests.
5. Interpret the descriptive and inferential results.
6. Examine God's natural order in light of mathematical understanding.

## Course Textbook

Ott, R. L. & Longnecker, M. (2016). *An Introduction to Statistical Methods & Data Analysis*, 7/E with WebAssign. Boston, MA: Brooks/Cole Cengage Learning.

Schmuller, J. (2017). *Statistical Analysis with R For Dummies*. Hoboken, NJ: John Wiley & Sons, Inc.

## IWU Diversity Statement

IWU, in covenant with God's reconciling work and in accordance with the Biblical principles of our historic Wesleyan tradition, commits to build a community that reflects Kingdom diversity. We will foster an intentional environment for living, teaching and learning, which exhibits honor, respect, and dignity. Acknowledging visible or invisible differences, our community authentically values each member's earthly and eternal worth. We refute ignorance and isolation and embrace deliberate and courageous engagement that exhibits Christ's commandment to love all humankind.

## Grading Scale

Grade	Quality Points Per Credit	Percentage	Score
A	4.0	95%–100%	950–1000
A-	3.7	92%–94.9%	920–949
B+	3.3	89%–91.9%	890–919
B	3.0	85%–88.9%	850–889
B-	2.7	82%–84.9%	820–849
C+	2.3	79%–81.9%	790–819
C	2.0	75%–78.9%	750–789
C-	1.7	72%–74.9%	720–749
D+	1.3	69%–71.9%	690–719
D	1.0	65%–68.9%	650–689
F	0.0	0%–64.9%	0–649

## Grading Policies

Your grading policy for your course is dependent on your school and program. Your grading policies can be found in the IWU Catalog.

## Letter Grade Equivalencies

Grade	Description of Work
<b>A</b>	Clearly stands out as excellent performance. Has unusually sharp insights into material and initiates thoughtful questions. Sees many sides of an issue. Articulates well and writes logically and clearly. Integrates ideas previously learned from this and other disciplines. Anticipates next steps in progression of ideas. Example "A" work should be of such nature that it could be put on reserve for all cohort members to review and emulate. The "A" cohort member is, in fact, an example for others to follow.
<b>B</b>	Demonstrates a solid comprehension of the subject matter and always accomplishes all course requirements. Serves as an active participant and listener. Communicates orally and in writing at an acceptable level for the degree program. Work shows intuition and creativity. Example "B" work indicates good quality of performance and is given in recognition for solid work; a "B" should be considered a good grade and awarded to those who submit assignments of quality less than the exemplary work described above.
<b>C</b>	Quality and quantity of work in and out of class is average. Has marginal comprehension, communication skills, or initiative. Requirements of the assignments are addressed at least minimally.
<b>D</b>	Quality and quantity of work is below average. Has minimal comprehension, communication skills, or initiative. Requirements of the assignments are addressed at below acceptable levels.
<b>F</b>	Quality and quantity of work is unacceptable and does not qualify the student to progress to a more advanced level of work.

## Course Module Summary

Module	Discussion	WebAssign	Dropbox	Total Points	Estimated Time
<b>Module One</b>	2/30	1/20	1/50	100	<b>12 hours</b>
<b>Module Two</b>	2/30	2/100		130	<b>15 hours</b>
<b>Module Three</b>	2/30	1/70	1/55	155	<b>14 hours</b>
<b>Module Four</b>	2/30	1/90		120	<b>10 hours</b>
<b>Module Five</b>	2/30	1/90		120	<b>10 hours</b>
<b>Module Six</b>	2/30	1/70	1/60	160	<b>14 hours</b>
<b>Module Seven</b>	2/30	1/70		100	<b>10 hours</b>
<b>Module Eight</b>	2/30		1/85	115	<b>8 hours</b>

<b>Course Totals</b>	<b>16/240</b>	<b>8/510</b>	<b>4/250</b>	<b>1000</b>	<b>93 hours</b>
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\* Number of Activities/Sum Point Totals. These timings are based on estimations of average times to complete each assignment. Actual assignment completion times will vary.

## Module One Outline

Assignments	Type	Due	Estimated Time*	Points
<b>1.1 Biblical Wisdom</b>	Discussion	Initial post due by the fourth day of the module. One response due by the end of the module.	<b>1 hour</b>	10
<b>1.2 Discussion</b>	Discussion	Initial post due by the fourth day of the module. Two responses due by the end of the module.	<b>2 hours</b>	20
<b>1.3 Getting Started with WebAssign</b>	WebAssign	Due by the end of the module	<b>1 hours</b>	20
<b>1.4 Chapter 1 &amp; 2 Homework</b>	Dropbox	Due by the end of the module	<b>8 hours</b>	50
<b>Totals</b>			<b>12 hours</b>	<b>100</b>

## Module Two Outline

Assignments	Type	Due	Estimated Time*	Points
<b>2.1 Biblical Wisdom</b>	Discussion	Initial post due by the fourth day of the module. One response due by the end of the module.	<b>1 hour</b>	10
<b>2.2 Discussion</b>	Discussion	Initial post due by the fourth day of the module. Two responses due by the end of the module.	<b>2 hours</b>	20
<b>2.3 Chapter 3 Homework</b>	WebAssign	Due by end of the module	<b>6 hours</b>	50
<b>2.4 Chapter 4 Homework</b>	WebAssign	Due by end of the module	<b>6 hours</b>	50

<b>Totals</b>	<b>15 hours</b>	<b>130</b>
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### Module Three Outline

Assignments	Type	Due	Estimated Time*	Points
<b>3.1 Biblical Wisdom</b>	Discussion	Initial post due by the fourth day of the module. One response due by the end of the module.	<b>1 hour</b>	10
<b>3.2 Discussion</b>	Discussion	Initial post due by the fourth day of the module. Two responses due by the end of the module.	<b>2 hours</b>	20
<b>3.3 Chapter 5 Homework</b>	WebAssign	Due by end of the module	<b>7 hours</b>	70
<b>3.4 Calculus &amp; Statistics I</b>	Dropbox	Due by end of the module	<b>4 hours</b>	55
<b>Totals</b>			<b>14 hours</b>	<b>155</b>

### Module Four Outline

Assignments	Type	Due	Estimated Time*	Points
<b>4.1 Biblical Wisdom</b>	Discussion	Initial post due by the fourth day of the module. One response due by the end of the module.	<b>1 hour</b>	10
<b>4.2 Discussion</b>	Discussion	Initial post due by the fourth day of the module. Two responses due by the end of the module.	<b>2 hours</b>	20
<b>4.3 Chapter 6 Homework</b>	WebAssign	Due by the end of the module.	<b>7 hours</b>	90
<b>Totals</b>			<b>10 hours</b>	<b>120</b>

## Module Five Outline

Assignments	Type	Due	Estimated Time*	Points
<b>5.1 Biblical Wisdom</b>	Discussion	Initial post due by the fourth day of the module. One response due by the end of the module.	<b>1 hour</b>	10
<b>5.2 Discussion</b>	Discussion	Initial post due by the fourth day of the module. Two responses due by the end of the module.	<b>2 hours</b>	20
<b>5.3 Chapter 8 Homework</b>	WebAssign	Due by the end of the module	<b>7 hours</b>	90
<b>Totals</b>			<b>10 hours</b>	<b>120</b>

## Module Six Outline

Assignments	Type	Due	Estimated Time*	Points
<b>6.1 Biblical Wisdom</b>	Discussion	Initial post due by the fourth day of the module. One response due by the end of the module.	<b>1 hour</b>	10
<b>6.2 Discussion</b>	Discussion	Initial post due by the fourth day of the module. Two responses due by the end of the module.	<b>2 hours</b>	20
<b>6.3 Chapter 9 Homework</b>	WebAssign	Due by the end of the module.	<b>7 hours</b>	70
<b>6.4 Calculus &amp; Statistics II</b>	Dropbox	Due by the end of the module.	<b>4 hours</b>	60
<b>Totals</b>			<b>15 hours</b>	<b>160</b>

## Module Seven Outline

Assignments	Type	Due	Estimated Time*	Points
<b>7.1 Biblical Wisdom</b>	Discussion	Initial post due by the fourth day of the module. One response due by the end of the module.	<b>1 hour</b>	10
<b>7.2 Discussion</b>	Discussion	Initial post due by the fourth day of the module. Two responses due by the end of the module.	<b>2 hours</b>	20
<b>7.3 Chapter 10 Homework</b>	WebAssign	Due by end of the module.	<b>7 hours</b>	70
<b>Totals</b>			<b>10 hours</b>	<b>100</b>

## Module Eight Outline

Assignments	Type	Due	Estimated Time*	Points
<b>8.1 Biblical Wisdom</b>	Discussion	Initial post due by the fourth day of the module. One response due by the end of the module.	<b>1 hour</b>	10
<b>8.2 Discussion</b>	Discussion	Initial post due by the fourth day of the module. Two responses due by the end of the module.	<b>2 hours</b>	20
<b>8.3 Calculus and Statistics III</b>	Dropbox	Due by the end of the module.	<b>5 hours</b>	85
<b>8.4 End of Course Survey</b>	Dropbox	Due by the end of the module.	<b>30 minutes</b>	10 extra credit
<b>Totals</b>			<b>8.5 hours</b>	<b>115</b>
<b>Course Totals</b>			<b>92.5 hours</b>	<b>1000</b>

\* These timings are based on estimations of average times to complete each assignment. Actual assignment completion times will vary.

## Pacing Guide

- Module 1 is due by the end of Week 1.
- Module 2 is due by the end of Week 2.
- Module 3 is due by the end of Week 3.

- Module 4 is due by the end of Week 4.
- Module 5 is due by the end of Week 5.
- Module 6 is due by the end of Week 6.
- Module 7 is due by the end of Week 7.
- Module 8 is due by the end of Week 8.

## Course Development Resources

Ott, R. L. & Longnecker, M. (2016). *An Introduction to Statistical Methods & Data Analysis, 7/E*, with WebAssign. Boston, MA: Brooks/Cole Cengage Learning.

Schmuller, J. (2017). *Statistical Analysis with R For Dummies*. Hoboken, NJ: John Wiley & Sons, Inc.

Tamhane, A. C. & Dunlop, D. D. (2000). *Statistics and Data Analysis: from Elementary to Intermediate*. Boston, MA: Pearson Education. ISBN-13: 9780137444267