

**Math 5: Introduction to Statistics**  
**VL 106**  
**MWF 8 - 9:05**  
**MWF 9:15 - 10:20**  
**Westmont College Spring 2007**

**Professor:** Scott Taylor

**Office:** Math and Computer Science Building (near Post Office)

**Office Hours:** Monday, Wednesday, Friday 2- 3 PM; Thursday 9 - 10 AM and 3 - 4 PM ;  
and by appointment.

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**Prerequisite:** Fulfillment of mathematics competency requirement.

**Catalogue Course Description:** Descriptive statistics, correlation and regression. Distributions: normal, binomial, Student's t, chi-square, F. Inferential statistics; parametric and non-parametric tests for population parameters; tests for goodness-of-fit and independence; one- and two- way analysis of variance. Use an interactive computer program.

**Statistics and the Liberal Arts:**

**Common Inquiries: Reasoning Abstractly**

From the Westmont Catalog: "Courses satisfying this requirement focus on critical and analytical reasoning about non-empirical, abstract concepts, issues, theories, objects and structures. Students in these courses should learn to understand and evaluate abstract arguments and explanations, analyze abstract concepts and solve abstract problems."

While one focus of this course is on how the tools of statistics shed light on particular, concrete facts about the world, effective use of those tools requires you to understand, reason about, and solve problems using such abstract concepts as probability, sampling distributions, confidence intervals, and significance tests.

**Common Skills: Quantitative and Analytical Reasoning**

From the Westmont Catalog: "Central to courses satisfying this requirement is: the use of mathematical models for physical or social systems or; the understanding and communication of numeric data including the computation and interpretation of summative statistics and the presentation and interpretation of graphical representations of data. A core focus of the course is the explicit study of quantitative and analytic methods, or, alternatively, the reflective use of quantitative methods as a tool."

## **Institution-Wide Student Learning Standards**

### **1. Christian Orientation**

We want students to be informed about the Christian faith, and we desire that their lives be characterized by practices, affections, and virtues that grow out of a life of Christian faith. In keeping with that faith, we are committed to pursuing these goals in a spirit of hospitality and invitation, rather than in a spirit of coercion, manipulation, or intimidation.

### **2. Diversity**

Students have the understanding and skills to engage people unlike themselves--both individuals and groups--in ways that affirm others as persons created in God's image. Students are able to approach others respectfully--avoiding the natural tendency to deal with differences by vilifying, romanticizing, or victimizing.

### **3. Critical-Interdisciplinary Thinking**

Students are versatile thinkers, able to use appropriately the tools provided by different disciplinary methodologies and to understand that each discipline implies a particular epistemological orientation. Critical interdisciplinary thinking requires students to combine a variety of discipline-specific reasoning abilities in attempts to solve problems or answer questions. It also requires them to have the ability to frame appropriate questions; to think abstractly; to test definitions of key terms and categories of analysis, and to examine one's own assumptions.

### **4. Research and Technology**

Students will have the skills and critical understanding necessary to make use of appropriate technologies in accessing, evaluating and communicating information. In addition, they will possess the critical capacities necessary to evaluate the impact of technology on their work and in the world—understanding both the possibilities and limitations of technology.

### **5. Active Societal and Intellectual Engagement**

It is our hope that students are equipped to benefit from a Westmont education over the course of a lifetime. As a result of their educational program, they will have the skills, attitudes and commitments that enable them to be effective in both their personal and vocational lives throughout all the stages of their lives.

### **6. Written and Oral Communication**

Students will be effective communicators, both as speakers and writers, in a wide range of contexts. Their communication, both at the personal and professional level, will be characterized by clarity, accuracy, and graciousness.

**Course Objectives:** Statistics is the science of drawing conclusions from specific data using knowledge of probabilities. The statistical model analyzes data to provide descriptions of physical and social phenomenon which are used to make predictions and draw conclusions about the modeled situation.

This course will help you:

- develop skills in problem solving, abstract reasoning, and technical writing
- sharpen basic mathematical skills
- gain experience in the use of computational software

By the end of this course you should be able to:

- interpret commonly used statistics
- determine which statistical technique to use in a given situation
- identify potential errors and limitations when reading statistical methods in literature
- use basic statistical techniques

**Text:** Moore, David S. *The Basic Practice of Statistics 3rd Edition*. W.H. Freeman and Co.

**Calculators:** You will frequently need to use Excel (or other spreadsheet). Excel and the necessary data sets are on the computers in the Mathematics and CS dept. computer lab. You will also need a calculator. Any scientific calculator will do.

**Evaluation:**

Your course grade will be determined by a weighted average as follows:

15 % Quizzes	15 % Exam 1
5 % Projects	20 % Exam 2
5 % Daily Homework	25 % Final Exam
15 % Weekly Homework	

**However:** *If you receive fewer than 50% of the points on the final exam, you will receive an "F" in the course.*

Course letter grades will be assigned according to the following scale. Any curve will be determined at the end of the course, according to the discretion of the instructor.

93 - 100 %	A	73 - 77 %	C
90 - 93 %	A-	70 - 73 %	C-
87 - 90 %	B+	67 - 70 %	D+
83 - 87 %	B	63 - 67 %	D
80 - 83 %	B-	60 - 63 %	D-
77 - 80 %	C+	below 60 %	F

**Attendance:** Attendance is required. You are allowed 4 absences for any reason. Any absences beyond those four will result in the loss of one full letter grade in your final course grade. For instance, a B+ would be changed to a C+. This policy may be amended in the case of an emergency. Please contact the instructor as soon as possible upon word of an emergency that will result in extended absence from class.

**Quizzes:** Weekly quizzes will be given each Monday (or following Wednesday, in case of a Monday holiday). They will typically consist of 1 or 2 questions, designed to test your understanding of the previous week's material. In case of an absence, a makeup quiz may be arranged with the instructor.

**Homework:** Homework is an integral part of this course. You have not learned the subject if you cannot work through problems on your own. Homework is your chance to be sure that you understand the material and your chance to discover questions pertaining to the subject matter. You are encouraged to work together on the homework. This does not mean, "You do problems 1 - 3 and I'll do problems 4 - 6 and we'll exchange answers". **All work must be your own.** Homework assignments will be given in class and will also be posted on the class website. You are strongly encouraged to check the website to be sure that you have the entire assignment.

There are two types of homework in this course: daily and weekly. The purpose of daily homework is to make sure that you are ready for each new class. You will receive full credit for daily homework if you make a reasonable attempt on each problem. Weekly homework is intended to give you more in-depth practice. Almost every problem will be completely graded. Weekly Homework will be due at the beginning of the class period indicated (usually on a Friday). If you are absent from class on the day homework is due, you should send the assignment with a friend or arrange to turn it in early. Late assignments will not be accepted unless cleared with the instructor in advance. Except in cases of emergency, extensions will not be granted.

Homework must be **very readable**. This means **no** messy scratchwork, no huge eraser marks, no loose pages. Problems must be in order with the section and problem number clearly indicated. **You must show all of your work.** Your work is your answer. Again, you must show all of your work.

**Exams:** The two midterm exams will be in-class on the days indicated in the schedule. the final exam is on **Wednesday, May 2**. The final is cumulative. **The final exam may not be rescheduled** for personal convenience, airline reservations, etc. Requests to reschedule a final because you have three scheduled in one day or because of a special situation must be completed and turned into the Student Records Office by Wednesday, April 18. Exams will be designed to test your understanding of the material, not just your computational capabilities. You must understand, and communicate, the material.

Class	Day	Date	Section	Comments
1	Mon.	Jan. 8	Chp. 1	
2	Wed.	Jan. 10	Chp. 1	
3	Fri.	Jan. 12	Chp. 2	Weekly Homework (WHW) #1 due.
	Mon.	Jan. 15	<b>MLK Holiday</b>	
4	<b>Tues.</b>	Jan. 16	Chp. 2	Quiz #1.
5	Wed.	Jan. 17	Chp. 3	Last day to drop.
6	Fri.	Jan. 19	Chp. 3 - Chp. 4	WHW #2 due.
7	Mon.	Jan. 22	Chp. 4	Quiz #2.
8	Wed.	Jan. 24	Chp. 5	
9	Fri.	Jan. 26	Chp. 5 - Chp. 6	WHW #3 due.
10	Mon.	Jan. 29	Chp. 6	Quiz #3.
11	Wed.	Jan. 31	Review/Catch-up	
12	Fri.	Feb. 2	Chp. 7	WHW #4 due.
13	Mon.	Feb. 5	Chp. 8	Quiz #4.
14	Wed.	Feb. 7	Chp. 8	
15	Fri.	Feb. 9	Chp. 9	WHW #5 due.
16	Mon.	Feb. 12	Chp. 9	Quiz #5.
17	Wed.	Feb. 14	Review	
18	Fri.	Feb. 16	<b>Exam 1</b>	WHW #6 due.
	Mon.	Feb. 19	<b>Presidents' Holiday</b>	
19	Wed.	Feb. 21	Chp. 9	
20	Fri.	Feb. 23	Chp. 10	WHW #7 due.
21	Mon.	Feb. 26	Chp. 10	Quiz #6.

Class	Day	Date	Section	Comments
22	Wed.	Feb. 28		
23	Fri.	March 2	Chp. 12	WHW #8 due.
24	Mon.	March 5	Chp. 12	Quiz #7.
25	Wed.	March 7	Chp. 13	
26	Fri.	March 9	Chp. 14	WHW #9 due.
	MWF	Mar. 12-16	<b>Spring Break</b>	
27	Mon.	March 19	Chp. 15	Quiz #8.
28	Wed.	March 21	Chp. 16	
29	Fri.	March 23		Last day to withdraw. WHW #10 due.
30	Mon.	March 26	Chp. 16	Quiz #9.
31	Wed.	March 28	Catch-up	
32	Fri.	March 30	Chp. 17	WHW #11 due.
33	Mon.	April 2	<b>Review</b>	
34	Wed.	April 4	<b>Exam 2</b>	
	Fri.	April 6	<b>Good Friday</b>	
	Mon.	April 9	<b>Easter Monday</b>	
35	Wed.	April 11	Chp. 17	
36	Fri.	April 13	Chp. 18	WHW #12 due.
37	Mon.	April 16	Group Project	Quiz #10.
38	Wed.	April 18	Chp. 19	
39	Fri.	April 20	Chp. 20	WHW #13 due.
40	Mon.	April 23	Chp. 21	Quiz #11.

Class	Day	Date	Section	Comments
41	Wed.	Dec. 6	Chp. 21	
42	Fri.	April 25	Review	WHW #14 due.
	<b>Wed.</b>	<b>May 2</b>	<b>FINAL EXAM for 8 AM section is from 8 AM - 10 AM</b>	<b>FINAL EXAM for 9:15 AM section is from 12 PM to 2 PM</b>