

# STAT 496: Applied Statistics for Industry II

## Syllabus, Spring 2009

**Instructor:** W. Robert Stephenson, Department of Statistics,  
**Mailing Address:** 327 Snedecor Hall, Iowa State University,  
 Ames, IA 50011-1210  
**phone:** (515) 294-7805  
**fax:** (515)294-4040  
**email:** wrstephe@iastate.edu  
**course website:** [www.public.iastate.edu/wrstephe/stat496.html](http://www.public.iastate.edu/wrstephe/stat496.html)  
**Office Hours:** MWF 10:00 to 10:50 Central Time, 1127 HNSB  
 and by appointment., 1407 Wilson Hall  
**Lecture:** This course will be delivered via the World Wide Web on WebCT. Students will view two lectures each week. Lectures and lecture handouts will be available on WebCT. The week of March 16 through 20 is Spring Break on campus.  
**Materials:** Course handouts are available on line through WebCT. Additional materials can be found on the course website.

The text for Stat 495, *Statistical Quality Design and Control*, 2<sup>nd</sup> edition by Devor, Chang and Sutherland will be used in Stat 496.

*Applications of Statistics to Industrial Experimentation* by Cuthbert Daniel  
*Design Analysis of Experiments*, 4<sup>th</sup> edition, by Douglas C. Montgomery  
*Statistics for Experimenters* by Box, Hunter and Hunter are good reference books.

**Exams:** Exam 1: to be completed by Friday, February 20  
 Exam 2: to be completed by Friday, April 3  
 Final Exam: to be completed by Friday, May 8

**Assignments:** The due date for each assignment is established when it is assigned. Homework will be due one week after it is assigned. A term project will be due on May 1.

**Grading:** Grading is based on your performance on exams, the project and homework assignments. The breakdown of points is as follows:

Exam 1:	100 pts
Exam 2:	100 pts
Homework:	100 pts
Project:	75 pts
Final Exam:	125 pts
Total	500 pts

Lecture #	Material Covered	Reading/Homework Assignment
	<b>Week of January 12, students view lectures 1 &amp; 2</b>	
Lecture 1	Course mechanics. A case study of a designed experiment.	
Lecture 2	Review of statistical thinking; Analytic vs. Enumerative.	
	<b>Week of January 19, students view lectures 3 &amp; 4</b>	Homework #1 assigned (10 pts)
Lecture 3	Case study; Magnificent 7, control charts, capability	Chapters 4-15.
Lecture 4	Helicopter experiment. General ideas of experimentation.	Sections 15.1-15.4
	<b>Week of January 26, students view lectures 5 &amp; 6.</b>	Homework #2 assigned (10 pts)
Lecture 5	Experimentation in an industrial setting.	
Lecture 6	One factor experiments. Design, sample size, informal analysis	<b>Homework #1 due Friday, Jan. 30</b>
	<b>Week of February 2, students view lectures 7 &amp; 8.</b>	Homework #3 assigned (10 pts)
Lecture 7	Simple linear regression.	
Lecture 8	Polynomial regression	<b>Homework #2 due Friday, Feb 6</b>
	<b>Week of February 9, students view lectures 9 &amp; 10.</b>	
Lecture 9	Experiments with more than one factor. Trade offs	
Lecture 10	Review for Exam 1	<b>Homework #3 due Friday, Feb 13</b>
	<b>Week of February 16, students view tape 11.</b>	
	<b>*** Exam 1: to be completed by Friday, Feb 20 ***</b>	
Lecture 11	2 <sup>2</sup> factorial with replication: design and informal analysis	
	<b>Week of February 23, students view tapes 12 &amp; 13.</b>	Homework # 4 assigned (15 pts)
Lecture 12	2 <sup>2</sup> factorial with replication: formal analysis.	Chapter 17
Lecture 13	2 <sup>2</sup> factorial with replication: prediction, diagnostics.	
	<b>Week of March 2, students view tapes 14 &amp; 15.</b>	Homework # 5 assigned (15 pts)
Lecture 14	2 <sup>p</sup> factorial with replication:	Chapter 18
Lecture 15	2 <sup>p</sup> factorial without replication: graphical analysis.	<b>Homework #4 due Friday, March 6</b>

Lecture #	Material Covered	Reading/Homework Assignment
	<b>Week of March 9, students view lectures 16 &amp; 17</b>	Homework #6 assigned (15 pts)
Lecture 16	Estimating variability.	
Lecture 17	Blocking designs.	<b>Homework #5 due Friday, March 13</b>
	<b>Week of March 16, Spring Break No Classes, No Office Hours</b>	
	<b>Week of March 23, students view lectures 18 &amp; 19</b>	
Lecture 18	Fractional replication.	Chapters 19.
Lecture 19	Review for Exam 2	<b>Homework #6 due Friday, Mar. 27</b>
	<b>Week of March 30, students view lecture 20</b>	
	<b>*** Exam 2: to be completed by Friday, Apr. 3 ***</b>	
Lecture 20	$2^{p-q}$ experiments	
	<b>Week of April 6, students view lectures 21 &amp; 22.</b>	Homework # 7 assigned (15 pts)
Lecture 21	Response surface methodology.	
Lecture 22	More on response surfaces	
	<b>Week of April 13, students view lectures 23 &amp; 24.</b>	
Lecture 23	Robust design, Taguchi	Sections 15.4-15.6
Lecture 24	Putting it all together.	Chapter 20
		<b>Homework # 7 due Friday, Apr. 17</b>
	<b>Week of April 20, students view lectures 25 &amp; 26.</b>	Homework # 8 assigned (10 pts)
Lecture 25	Analysis of lifetime data.	
Lecture 26	Analysis of censored data.	
	<b>Week of April 27, students view lectures 25 &amp; 26.</b>	
Lecture 27	More analysis of censored data.	
Lecture 28	Course summary, review for Final Exam	<b>Homework # 8 due Friday, May 1</b>
	<b>** Final Exam: to be completed by Friday, May 8 **</b>	