STAT 496: Applied Statistics for Industry II

Syllabus, Spring 2004

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Office Hours: MTWF 10:00–10:50 Central Time
MT 2:10–3:00 Central Time
and by appointment.

Lecture: Each week students will view the two lectures. There will be no classes the week of March 15 due to Spring Break at ISU.

Materials: Course handouts are available online through WebCT. Additional materials can be found on the course website www.public.iastate.edu/~wrstephe/stat496.html
The text for Stat 495 by Devor, Chang and Sutherland will be used in Stat 496. Applications of Statistics to Industrial Experimentation by Cuthbert Daniel, Design and Analysis of Experiments 4th Ed. by Douglas C. Montgomery and Statistics for Experimenters by Box, Hunter and Hunter are good reference books.

Exams: Exam 1: Week of February 16
Exam 2: Week of March 29
Final: Week of May 3

Assignments: The due date for each assignment is established when it is assigned. Usually homework will be due one week after it is assigned. A team project will be due on May 3

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

<table>
<thead>
<tr>
<th>Exam/Assignment</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>100 pts</td>
</tr>
<tr>
<td>Exam 2</td>
<td>100 pts</td>
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<tr>
<td>Homework</td>
<td>100 pts</td>
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<tr>
<td>Project</td>
<td>65 pts</td>
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<tr>
<td>Final Exam</td>
<td>135 pts</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>500 pts</strong></td>
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<tr>
<td>Tape Number/ Date</td>
<td>Material Covered</td>
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<tr>
<td><strong>Week of January 12, students view lectures 1 and 2.</strong></td>
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<tr>
<td><strong>Week of January 19, students view lectures 3 and 4.</strong></td>
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<tr>
<td>Lecture 3.</td>
<td>Case study; Magnificent 7, control charts, capability. Chapters 4-15</td>
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<tr>
<td>Lecture 4.</td>
<td>Helicopter experiment. General ideas of experimentation. Homework #1 assigned (10 pts) Sections 15.1-15.4</td>
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<tr>
<td><strong>Week of January 26, students view lectures 5 and 6. Homework 1 due January 30.</strong></td>
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<tr>
<td>Lecture 5.</td>
<td>Experimentation in an industrial setting. Homework #2 assigned (10 pts)</td>
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<tr>
<td>Lecture 6.</td>
<td>One factor experiments. Design, sample size, informal analysis.</td>
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<td><strong>Week of February 2, students view lectures 7 and 8. Homework 2 due February 6.</strong></td>
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<tr>
<td>Lecture 7.</td>
<td>Simple linear regression. Homework #3 assigned (10 pts)</td>
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<tr>
<td>Lecture 8.</td>
<td>Polynomial regression.</td>
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<td><strong>Week of February 9, students view tapes 9 and 10. Homework 3 due February 13.</strong></td>
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<tr>
<td>Lecture 9.</td>
<td>Experiments with more than one factor. Trade offs.</td>
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<tr>
<td>Lecture 10.</td>
<td>Review for Exam 1</td>
</tr>
</tbody>
</table>
Tape Number/Date | Material Covered | Reading/Homework Assignment
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**Week of February 16,** students take Exam 1 and view lecture 11.

***** **Exam 1 *****

Lecture 11.  $2^2$ factorial with replication:
  design and informal analysis.
  Chapter 16

**Week of February 23,** students view lectures 12 and 13.

Lecture 12.  $2^2$ factorial with replication:
  formal analysis.
  Chapter 17

Lecture 13.  $2^2$ factorial with replication:
  prediction, diagnostics.
  Homework # 4 assigned (15 pts)

**Week of March 1,** students view lectures 14 and 15. Homework 4 due March 5.

Lecture 14.  $2^p$ factorial with replication:
  Chapter 18
  Homework # 5 assigned (15 pts)

Lecture 15.  $2^p$ factorial without replication:
  graphical analysis.

**Week of March 9,** students view lectures 16 & 17. Homework 5 due March 12.

  Homework # 6 assigned (15 pts)

Lecture 17.  Blocking designs

**Week of March 15,** SPRING BREAK, no classes and no office hours.

**Week of March 22,** students view lectures 18 and 19. Homework 6 due March 26.

Lecture 18.  Fractional replication.
  Chapter 19

Lecture 19.  Review for Exam 2
Week of March 29, students take Exam 2 and view lecture 20.

******* Exam 2 *******

Lecture 20. \(2^{p-q}\) experiments

Week of April 5, students view lectures 21 and 22.

Lecture 21. Response surface methodology. Homework # 7 assigned (15 pts)

Week of April 12, students view lectures 23 and 24. Homework 7 due April 17.

Lecture 23. Robust design, Taguchi Sections 15.4-15.6
Lecture 24. Putting it all together. Chapter 20

Week of April 19, students view lectures 25 & 26.

Lecture 25. Analysis of lifetime data. Homework # 8 assigned (10 pts)
Lecture 26. Analysis of censored data.

Week of April 26, students view lectures 27 & 28. Homework 8 due April 30.

Lecture 27. More analysis of censored data.
Lecture 28. Course summary, review for Final Exam

Week of May 3, students take the Final Exam. Project due May 3.

******* Final Exam *******