

**The Ohio State University  
Colleges of the Arts and Sciences Course Change Request**

Statistics

Academic Unit

Statistics

622

Book 3 Listing (e.g., Portuguese)

Course Number

Summer      Autumn      Winter      Spring X      Year 2006

**Proposed effective date:** choose one quarter and put an "X" after it; and fill in the year. See the OAA curriculum manual for deadlines.

**A. Course Offerings Bulletin Information.** Follow instructions in the OAA curriculum manual. Before you fill out the "Present Course" information, be sure to check the latest edition of the *Course Offerings Bulletin* and subsequent Circulating Forms. You may find that the changes you need have already been made or that additional changes are needed. If the course offered is less than quarter or term, please also complete the Flexibly Scheduled/OffCampus/Workshop Request form.

**COMPLETE ALL ITEMS THIS COLUMN**

**Present Course**

1. Book 3 Listing: Statistical Theory III
2. Number: 622
3. Full Title: Statistical Theory III
4. 18-Char. Transcript Title: Statistical Thry 3
5. Level and Credit Hours G 5
6. Description: Likelihood ratio tests, Neyman Pearsn theorem and unifroomly most powerfui tests, confidence intervals, applications to linear models  
(25 words or less)
7. Qtrs. Offered : spring
8. Distribution of Contact Time: 5 cl  
(e.g., 3 cl, 1 3-hr lab)
9. Prerequisite(s): STAT 621
10. Exclusion:  
(Not open to....)
11. Repeatable to a maximum of \_\_\_\_\_ credits.
12. Off-Campus Field Experience:
13. Cross-listed with:
14. Is this a GEC course?
15. Grade option (circle): Ltr X      S/U      P  
If P graded, what is the last course in the series?
16. Is an honors version of this course available?
17. Other general course information:

**COMPLETE ONLY THOSE ITEMS THAT CHANGE  
Changes Requested**

- 1.
- 2.
- 3.
- 4.
5. UG
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.
- 17.

**B. General Information**

1. Do you want the prerequisites enforced electronically (see the OAA manual for what can be enforced)?
2. Does this course currently satisfy any GEC requirement, if so indicate which category?
3. What other units require this course? Have these changes been discussed with those units?
4. Have these changes been discussed with academic units that might have a jurisdictional interest in the subject matter? Attach relevant letters.
5. Is the request contingent upon other requests, if so, list the requests?
6. Purpose of the proposed change. (If the proposed change affects the content of the course, attach a revised syllabus and course objectives and e-mail to [ascurofc@osu.edu](mailto:ascurofc@osu.edu).)
7. Please list Majors/Minors affected by the proposed change. Attach revisions of all affected programs. This course is (check one):  
 Required on major(s)/minor(s)       A choice on major(s)/minors(s)  
 An elective within major(s)/minor(s)       A general elective:
8. Describe any changes in library, equipment or other teaching aids needed as a result of the proposed change or if the proposed change involves budgetary adjustments, describe the method of funding:

**Approval Process** The signatures on the lines in ALL CAPS ( e.g. ACADEMIC UNIT) are required.

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|--|---|-------------------------|
| 1. Academic Unit Undergraduate Studies Committee Chair   | Printed Name                            | Date                    |
| 2. Academic Unit Graduate Studies Committee Chair  | Printed Name                            | Date                    |
| 3. <b>ACADEMIC UNIT CHAIR/DIRECTOR</b>   | <i>Douglas A. Wolfe</i><br>Printed Name | <i>12/29/05</i><br>Date |
| 4. After the Academic Unit Chair/Director signs the request, forward the form to the ASC Curriculum Office, 105 Brown Hall, 190 West 17 <sup>th</sup> Ave. or fax it to 688-5678. Attach the syllabus and any supporting documentation in an e-mail to <a href="mailto:ascurofc@osu.edu">ascurofc@osu.edu</a> . The ASC Curriculum Office will forward the request to the appropriate committee. |   |                         |
| 5. <b>COLLEGE CURRICULUM COMMITTEE</b>   | <i>John Parson</i><br>Printed Name      | <i>1/12/06</i><br>Date  |
| 6. <b>ARTS AND SCIENCES EXECUTIVE DEAN</b>   | <i>Edward Adels</i><br>Printed Name     | <i>1/13/06</i><br>Date  |
| 7. Graduate School (if appropriate)  | Printed Name                            | Date                    |
| 8. University Honors Center (if appropriate)   | Printed Name                            | Date                    |
| 9. Office of International Affairs (study tours only)  | Printed Name                            | Date                    |
| 10. <b>ACADEMIC AFFAIRS</b>  | Printed Name                            | Date                    |

Credit Hours: 4

Instructor: Professor Santner (415 Cockins Hall)

Office Hours: M & F 10:00–11:30 or by appointment

Prerequisites: Calculus, Basic matrix algebra, Stat 621

Text: G. Casella and R. Berger *Statistical Inference*, 2nd edition. Duxbury Press

Course Web Site: <http://stat.ohio-state.edu/~tjs/622>

**Related Texts:**

- Bickel, Peter J. and Kjell A. Doksum (2001) *Mathematical Statistics: Basic Ideas and Selected Topics*, 2<sup>nd</sup> Edition, Prentice Hall, New Jersey. (same level as C/B)
- Casella, George and Roger Berger (1990) *Statistical Inference*, 1st edition. Duxbury Press (Chapter 10 introduces Decision Theory)
- Hogg, Robert V. and Allen T. Craig (1995) *Introduction to Mathematical Statistics*, Prentice Hall, N.J. (simpler than C/B)
- Kiefer, Jack (1987) *Introduction to Statistical Inference*, (with editing by Gary Lorden) Springer-Verlag, Inc, New York. (Introduction from a Decision Theoretic Viewpoint)
- Rohatgi, V. K. (1976) *An Introduction to Probability Theory and Mathematical Statistics*, J. Wiley & Sons.
- Schervish, Mark J. (1997) *Theory of Statistics*, Springer-Verlag Inc, Berlin; New York (more advanced introduction to Statistics than C/B)

**Course Goals** Statistics 622 is the second half of a two-quarter course sequence on statistical inference. As in Statistics 621, the emphasis is on a non-measure theoretical development of the modeling and inferential tools needed in statistical practice and research. The course will cover some introductory elements of Decision Theory, as well as selected topics from Chapters 8 (Hypothesis Testing), 9 (Interval Estimation), and 10 (Asymptotic Evaluation of tests and interval estimators) of the textbook. *It is critical that you work problems.* Most of the problems can be worked using several methods—it can be very instructive to discover how many ways you can work each exercise! I will assign a selection of problems to be graded; try as many others as you can. For those students who will be taking the Statistics Qualifier I Exam, I will also point some additional problems that you may want to work to help prepare for this exam.

**Grading Scheme**

Component	Grade
Homework (no late homework accepted)	20%
Test #1 (April 22)	25%
Test #2 (May 23)	25%
Final (June 6, 2004)	30%

## Outline

### I. The Decision Theoretic View of Statistics

- Elements of a Statistical Problem
- Using the Risk Function to Evaluate a Statistical Procedure
- Principles for Comparing Statistical Procedures
- Finding Bayes Procedures
- Finding Minimax Procedures

### II. Hypothesis Testing

- Introduction
- Heuristic Methods of Constructing Tests
  1. Neyman-Pearson Lemma
  2. Likelihood Ratio Tests
  3. Score Tests
  4. Union-Intersection and Intersection-Union Tests
- Methods of Evaluating Hypothesis Tests

### III. Interval Estimation

- Introduction
- Heuristic Methods of Constructing Confidence Intervals
  1. Inverting a family of tests
  2. Find a Pivotal Quantity
  3. Tail Method (for discrete data)
- Methods of Evaluating Confidence Intervals
- Bayesian Intervals

### IV. Large Sample Tests

- Review of Convergence Modes
  - Asymptotic Distribution of Likelihood Ratio Tests
  - Asymptotic Evaluation of Interval Estimators
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