New Course Request

Indiana University

Check Appropriate Boxes: Undergraduate credit [X] Graduate credit [] Professional credit []

1. School/Division Liberal Arts and Sciences
2. Academic Subject Code MATH
3. Course Number M468 (must be cleared with University Enrollment Services)
4. Instructor Yi Cheng
5. Course Title Advanced Statistical Techniques II

Recommended Abbreviation (Optional)

(Limited to 32 Characters including spaces)

6. First time this course is to be offered (Semester/Year): Fall 2005
7. Credit Hours: Fixed at [ ] or Variable from _________ to _________
8. Is this course to be graded S-F (only)? Yes [ ] No [X]
9. Is variable title approval being requested? Yes [ ] No [X]

10. Course description (not to exceed 50 words) for Bulletin publication: 
P: M366 or M466 or consent of instructor. Analysis of discrete data, chi-square tests of goodness of fit and contingency tables, Behrens-Fisher problem, comparison of variances, nonparametric methods, and some of the following topics: introduction to multivariate analysis, discriminant analysis, principal components.

11. Lecture Contact Hours: Fixed at [ ] or Variable from _________ to _________
12. Non-Lecture Contact Hours: Fixed at _________ or Variable from _________ to _________
13. Estimated enrollment: [ ] of which [ ] percent are expected to be graduate students.
14. Frequency of scheduling: [ ] Every 2 yrs Will this course be required for majors? [ ]
15. Justification for new course: Satisfies campus-wide need for advanced, upper-level statistical techniques course. [ ]
16. Are the necessary reading materials currently available in the appropriate library? [ ]
17. Please append a complete outline of the proposed course, and indicate instructor (if known), textbooks, and other materials.
18. If this course overlaps with existing courses, please explain with which courses it overlaps and whether this overlap is necessary, desirable, or unimportant.
19. A copy of every new course proposal must be submitted to departments, schools, or divisions in which there may be overlap of the new course with existing courses or areas of strong concern, with instructions that they send comments directly to the originating Curriculum Committee. Please append a list of departments, schools, or divisions thus consulted.

Submitted by: Date 10-15-04
Department Chairman/Division Director

Approved by: Date 11-15-04
Chancellor/Vice-President

Dean

University Enrollment Services

After School/Division approval, forward the last copy (without attachments) to University Enrollment Services for initial processing, and the remaining four copies and attachments to the Campus Chancellor or Vice-President.

UP 724 University Enrollment Services Final—White; Chancellor/Vice-President—Blue; School/Division—Yellow; Department/Division—Pink; University Enrollment Services Advance—White
The Outline of M468
Advanced Statistical Techniques II
Yi Cheng, Mathematical Sciences Department, IUSB
October 14, 2004


This course is designed to meet the campus wide needs, as well as the community needs, for an advanced course in statistics. It has wide applications in business, economics, psychology, sociology, biology, education, and public health. It also serves as a selective upper level course for math majors as well as a math course for master students in Applied Mathematics and Computer Science.

1. **Analysis of variance and general experiment design** (about 10 lectures)
   - Randomization against confounding
   - Completely randomized design
   - The multivariate normal distribution
   - General method for multivariate testing problems
   - Test for equality of several variances
   - Compare treatments with a control
   - Comparing a set of treatments in blocks
   - Randomized complete block designs
   - Random effect model

2. **Factorial Experiments** (about 6 lectures)
   - Factorial experiments with crossing and nesting of factors
   - Interaction and two-factor experiment
   - Two factor analysis of variance
   - Choice of sample size
   - Power of analysis-of-variance

3. **Multivariate analysis** (about 14 lectures)
   - Analysis of discrete (categorical) data
   - Chi-square tests of goodness of fit and contingency tables
   - Multivariate analysis of variance.
   - Analysis of the structure of covariance matrices:
     --- Principal components
     --- Canonical correlations
     --- Factor-analytical and structural models
   - Discriminant analysis.
     --- Classification of observations into populations
     --- Misclassification errors

There will be weekly homework assignments, five projects, two midterm tests, and a final exam.