Texas A&M University
Departmental Request for a New Course
Undergraduate ♦ Graduate ♦ Professional
* Submit original form and attach a course syllabus.*

1. This request is submitted by the Department of **STATISTICS**

2. Course prefix, number and complete title of course: **STAT 662 - Advanced Statistical Genetics**

3. Course description (not more than 50 words): This course is a continuation of the course, STAT 661 Statistical Genetics. A strong background in statistics, genetics, and mathematics is required. Topics include counting methods, EM algorithm, Newton's method, scoring in genetics, genetic identity coefficients, descent graphs, molecular phylogeny, models of recombination, sequence analysis, diffusion processes, and linkage disequilibrium mappings.

4. Prerequisite(s) **STAT 610, 611, 661**

5. Is this a variable credit course? □ Yes ☑ No If yes, from _______ to _______.

6. Is this a repeatable course? □ Yes ☑ No If yes, this course may be taken _______ times. Will the course be repeated within the same semester/term? □ Yes ☑ No

7. Has this course been taught as a 289/489/689? ☑ Yes □ No If yes, how many times? _______ Indicate the number of students enrolled for each academic period it was taught. 03A-9; 05A-4; 06C-10

8. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

9. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. **Attach approval letters.**

10. Prefix | Course # | Title (excluding punctuation)
   **STAT 662 ADVANCED STAT GENETICS**

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Approval recommended by: [Signature] 12-4-2007
Head of Department

Date
[Signature] 12/10/07
Chair, College REDAC Committee

Date
[Signature] 12/10/07
Dean of College

Date

Submitted to Coordinating Board by:

Director of Academic Support Services

Date

Effective Date

Questions regarding this form should be directed to Sandra Williams at 845.8836.
OAR/AS – 04/07
STAT 662 Advanced Statistical Genetics

Instructor: Ruzong Fan,

Classroom: Blocker 411, Fall 2006 (for 2006-2007 academic year).

Credits, Class Periods: 3 credits; MWF 12:40-1:30PM.

Description

This is a continuing course of Stat 661 Statistical Genetics. It intends for Ph.D students with advanced knowledge of statistics, genetics, and better mathematical preparation. The advanced materials of statistical genetics will be taken from Lange (2002) Mathematical and Statistical Methods for Genetic Analysis, 2nd edition, Springer. Moreover, the latest articles from journals such as American Journal of Human Genetics, Nature, Nature Genetics, and Science will be used to catch up with the latest development. Research topics of statistical genetics will be introduced for students to fit their interests and possibly lead to their dissertation topics.

Prerequisites
Stat 610, 611, 661

Course Outline

1. Basic principles of population genetics
2. Counting methods and the EM algorithm
3. Newton’s method and scoring in genetics
4. Hypothesis testing and categorical data
5. Genetic identity coefficients
6. Applications of identity coefficients
7. Descent graph methods
8. Molecular phylogeny
9. Models of recombination
10. Sequence analysis
11. Poisson Approximation
12. Diffusion processes

13. Linkage disequilibrium mapping of quantitative trait loci

Instructional Objectives
After taking this class, students will have advanced knowledge of modern statistical methods for genetic study, and can start to do research in the field.

Evaluation Methods of the Course
Minimum requirements for a grade A: (1) Attend class regularly; (2) Do four problems with CORRECT SOLUTION each week. To be safe for a grade A, it is better to finish as many problems as possible! Of course, students are expected to work seriously on each problem which they choose. Students may choose problems from the problem list at the end of each chapter. Instructor does not specify which problems to choose for students, but he expect that students to choose the problems that the instructor himself has not had a solution yet! Homework problems count 100% for grade, no project, no exam! Homework due in every two week circle!

Relationship of the Course to Other Courses
This is a continuing course of Stat 661 Statistical Genetics

Relationship of the Course to Major, Minor, or Option
N/A — See above.

Consultation with Other Departments and Academic Support Units

Technology Needs
Student must have a pocket calculator, access to a modern computer which may run genetic software such as GENEHUNTER and MENDEL (e.g. Unix Sunstation), and TDT/S-TDT (Microsoft)

Frequency of Offering and Enrollment
Once every two years

Effective date from
January 2003
MEMORANDUM

TO: Dr. James Wild
   Chair, Intercollegiate Faculty in Genetics

FROM: Michael Longnecker, Associate Department Head
       Department of Statistics

SUBJECT: Approval of Statistical Genetics Course

The Department of Statistics has requested approval from the Graduate Council to include in our graduate teaching offerings an advanced course in statistical genetics. We currently teach an introductory course in statistical genetics, STAT 661. The department would like to include in our curriculum an advanced statistical genetics course which would be intended for statistics PhD students, although it would be open to any student meeting the course prerequisites. We have taught this course during the Spring 2003, Spring 2005, and Fall 2006 semesters as a STAT 689 course. I have attached a copy of the syllabus for the course for your review.

The Graduate Council requires that we contact you to determine if there would be any objections from the Intercollegiate Faculty in Genetics. If you do not see any conflict between this course and any of the graduate courses offered by the Intercollegiate Faculty in Genetics, a letter to the effect addressed to me would be greatly appreciated.