Nikou, Roshan

From: Graduate.Council.Web.Site@www.uky.edu
Sent: Tuesday, December 02, 2008 7:12 PM
To: Nikou, Roshan
Cc: Price, Cleo
Subject: Investigator Report

AnyForm User: www.uky.edu
AnyForm Document: http://www.research.uky.edu/gs/GCInvestigatorReport.html
AnyForm Server: www.uky.edu (/www/htdocs/AnyFormTurbo/AnyForm.php)
Client Address: 128.163.161.136

College/Department/Unit: = STA 605
Category:_ = New
Date_for_Council_Review: = 12/4/08
Recommendation_is:_ = Approve
Investigator: = T. Troland
E-mail_Address = troland@pa.uky.edu
1__Modifications: = None, routine investigation
2__Considerations: =
3__Contacts: = I discussed this new course with Kert Viele, no problems were identified.
4__Additional_Information: =

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OFFICE OF THE SENATE COUNCIL

APPLICATION FOR NEW COURSE

1. Submitted by the College of Arts and Sciences Date: 9/3/2008

   Department/Division proposing course: Statistics

2. Proposed designation and Bulletin description of this course:

   a. Prefix and Number STA 605

   b. Title* Computational Inference

   *If title is longer than 24 characters, offer a sensible title of 24 characters or less: _____

   c. Courses must be described by at least one of the categories below. Include number of actual contact hours per week..

   (___) CLINICAL (___) COLLOQUIUM (___) DISCUSSION (___) LABORATORY (3) LECTURE

   (___) INDEPEND. STUDY (___) PRACTICUM (___) RECITATION (___) RESEARCH (___) RESIDENCY

   (___) SEMINAR (___) STUDIO (_____) OTHER – Please explain: _____

   d. Please choose a grading system: ☒ Letter (A, B, C, etc.) ☐ Pass/Fail

   e. Number of credit hours: 3

   f. Is this course repeatable? YES ☐ NO ☒ If YES, maximum number of credit hours: _____

   g. Course description:

   Statistical Packages, numerical methods in maximization and integration, bootstrapping, simulation methods, multivariate normal distribution.

   h. Prerequisite(s), if any:

   Graduate Standing in Statistics

   i. Will this course also be offered through Distance Learning? YES ☐ NO ☒

   If YES, please check one of the methods below that reflects how the majority of the course content will be delivered:

   Internet/Web-based ☐ Interactive video ☐ Extended campus ☐

3. Supplementary teaching component: ☒ N/A or ☐ Community-Based Experience ☐ Service Learning ☐ Both

4. To be cross-listed as: _____ (Prefix and Number) _____ / _____ (printed name / Cross-listing Department Chair signature)

5. Requested effective date (term/year): Fall / 2009

6. Course to be offered (please check all that apply): ☒ Fall ☐ Spring ☐ Summer

APPLICATION FOR NEW COURSE

7. Will the course be offered every year? ☒ YES ☐ NO

   If NO, please explain: _____

8. Why is this course needed?
   Course is part of changes to the M.S. in Statistics. Computational methods have been heavily developed in statistics over the past two decades. Previously the basic skills for statistical computation have been covered through multiple courses. This course provides the basics in a single course that provides background for the remainder of the program

9. a. By whom will the course be taught? Any faculty member in statistics

   b. Are facilities for teaching the course now available? ☒ YES ☐ NO

   If NO, what plans have been made for providing them?

10. What yearly enrollment may be reasonably anticipated?
    8-15

11. a. Will this course serve students primarily within the department? ☒ Yes ☐ No

    b. Will it be of interest to a significant number of students outside the department? ☐ YES ☒ NO
    If YES, please explain.

12. Will the course serve as a University Studies Program course†? ☐ YES ☒ NO

    If YES, under what Area? _____

    †AS OF SPRING 2007, THERE IS A MORATORIUM ON APPROVAL OF NEW COURSES FOR USP.

13. Check the category most applicable to this course:

    ☐ traditional – offered in corresponding departments at universities elsewhere

    ☒ relatively new – now being widely established

    ☐ not yet to be found in many (or any) other universities

14. Is this course applicable to the requirements for at least one degree or certificate at UK? ☒ Yes ☐ No

15. Is this course part of a proposed new program? ☐ YES ☒ NO

    If YES, please name: _____

16. Will adding this course change the degree requirements for ANY program on campus? ☒ YES ☐ NO
    If YES‡, list below the programs that will require this course:

    Courses will be a requirement in the proposed revision of the M.S. in Statistics

‡In order to change the program(s), a program change form(s) must also be submitted.

APPLICATION FOR NEW COURSE

17. ☒ The major teaching objectives of the proposed course, syllabus and/or reference list to be used are attached.

18. ☐ Check box if course is 400G or 500. If the course is 400G- or 500-level, *you must include a syllabus showing differentiation* for undergraduate and graduate students by (i) requiring additional assignments by the graduate students; and/or (ii) the establishment of different grading criteria in the course for graduate students. (See *SR 3.1.4)*

19. Within the department, who should be contacted for further information about the proposed new course?

Name: Kert Viele Phone: 257-4803 Email: viele@uky.edu

20. Signatures to report approvals:

2/6/2008	Arnold J. Stromberg	/	
DATE of Approval by Department Faculty	printed name	Reported by Department Chair	signature
11/7/08	Leonidas G. Bachas		
DATE of Approval by College Faculty	printed name	Reported by College Dean	signature
		/	
* DATE of Approval by Undergraduate Council	printed name	Reported by Undergraduate Council Chair	signature
12/08/08	Robert J. Halsall		
* DATE of Approval by Graduate Council	printed name	Reported by Graduate Council Chair	signature
		/	
* DATE of Approval by Health Care Colleges Council (HCCC)	printed name	Reported by Health Care Colleges Council Chair	signature
* DATE of Approval by Senate Council		Reported by Office of the Senate Council	
* DATE of Approval by University Senate		Reported by Office of the Senate Council	

*If applicable, as provided by the *University Senate Rules.* (http://www.uky.edu/USC/New/RulesandRegulationsMain.htm)

STA605

Computational Inference

Learning Objectives

Instructor : To be taught by any member of the graduate faculty in Statistics

Overview : Course contains a introduction to a number of computational techniques useful in other courses in statistics. Statistical examples are used to illustrate the method, so the course also has brief introductions to bootstrapping, simulation methods, and nonparametric techniques. Course also includes an introduction to the multivariate normal as the sampling distribution for MLEs.

Format : 3 hours lecture

Prerequisite : Graduate Standing in Statistics

Learning objectives :

1) Introduction to statistics packages (3 weeks),
2) Newton-Raphson maximization and Numerical Integration (1 week) – emphasis includes implementation issues such as choice of starting values (including boundaries in an unbounded integration problem) and convergence to local minima/maxima
3) Integration via sampling techniques (1 week) – rejection and importance sampling
4) Bootstrapping (3 weeks)
5) Simulations (3 weeks) – illustration of sampling distributions, including those for point estimators, interval estimators (e.g. coverage), hypothesis testing (e.g. sizes and power), and p-values. Should include their use with nonparametric techniques such as rank tests.
6) Multivariate Normal Density and MLEs (4 weeks) – introduction to the multivariate normal density with exploratory methods (e.g. graphs of contours, etc.), definition of MLEs, sampling distribution of MLEs for simple single parameter distributions, bivariate sampling distribution of joint MLEs for normal mean and variance and simple linear regression estimates. Use of Newton-Raphson to compute MLEs for iid Beta and Gamma distributions and their resulting bivariate sampling distributions. Introduction to asymptotic normal sampling distribution of MLEs, and the illustration that the approximation works well in the previous examples (ties in with simulations studies, for example showing 95% confidence ellipsoids work). Also show examples of problems with using asymptotic results in small data sets.

Grading : Students will be graded on a mix of homework, exams, and projects at the discretion of the instructor. A standard grading scale of (>=90 at least an A, >=80 at least a B, >=70 at least a C, >=0 at least an E) should be used.