

## Nikou, Roshan

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**From:** Graduate.Council.Web.Site@www.uky.edu  
**Sent:** Tuesday, December 02, 2008 9:41 PM  
**To:** Nikou, Roshan  
**Cc:** Price, Cleo  
**Subject:** Investigator Report

AnyForm User: [www.uky.edu](http://www.uky.edu)  
AnyForm Document: <http://www.research.uky.edu/gc/GCInvestigatorReport.html>  
AnyForm Server: [www.uky.edu](http://www.uky.edu) (/www/htdocs/AnyFormTurbo/AnyForm.php)  
Client Address: 75.90.150.105

College/Department/Unit: = BST 760  
Category:\_ = New  
Date\_for\_Council\_Review: = 12/4/08  
Recommendation\_is:\_ = Approve  
Investigator: = Bill Smith  
E-mail\_Address = [bsmith@enr.uky.edu](mailto:bsmith@enr.uky.edu)  
1\_\_Modifications: = None  
2\_\_Considerations: = N/A  
3\_\_Contacts: =  
4\_\_Additional\_Information: = This course is part of a biostatistics track created for the proposed PhD in Epidemiology/Biostatistics, College of Public Health

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AnyForm/PHP3 0.1

AnyFormRandomSeqNo: 32678617

## APPLICATION FOR NEW COURSE

1. Submitted by the College of Public Health Date: March 10, 2008

Department/Division proposing course: Biostatistics

2. Proposed designation and Bulletin description of this course:

a. Prefix and Number BST 760

b. Title\* Advanced Regression

\*If title is longer than 24 characters, write a sensible title (24 characters or less) for use on transcripts:  
\_\_\_\_\_

c. Courses must be described by at least one of the categories below. Include the number of actual contact hours per week for each category, as applicable.

( ) 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:

This course provides an introduction to theoretical methods and applications of linear and generalized linear models. Regression methods for normally distributed outcomes will provide a discussion of experimental design, design matrices, and modes of parametric inference for the linear model. Students will learn to apply these concepts in sophisticated data analysis where they will implement tools for model building and selection, variable selection, and handling categorical predictors, confounders and interactions. Additionally, students will learn polynomial regression and flexible alternatives

such as weighted least squares and robust, ridge and nonparametric regression. Regression methods for non-normal outcomes (focusing on binomial and count data) will be covered in detail, providing students with foundational tools for understanding and implementing generalized linear models that are commonly used to analyze epidemiologic and public health data from various study designs including but not limited to cohort, case-control, and clinical trials.

h. Prerequisite(s), if any:

BST 675 (Biometrics I) and STA 580 (or equivalent)

Co-requisite: BST 676 (Biometrics II)

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

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

Internet/Web-based    Interactive video    Extended campus    Kentucky Educational Television (KET/teleweb)    Other

Please describe "Other": \_\_\_\_\_

3. Teaching method:  N/A or     Community-Based Experience     Service Learning Component     Both

## APPLICATION FOR NEW COURSE

4. To be cross-listed as: \_\_\_\_\_  
Prefix and Number Signature of chair of cross-listing department
5. Requested effective date (term/year): Spring / 2010
6. Course to be offered (please check all that apply):  Fall  Spring  Summer
7. Will the course be offered every year?  YES  NO  
If NO, please explain: \_\_\_\_\_
8. Why is this course needed?  
This course is a requirement in the proposed PhD in Epidemiology/Biostatistics.
- 
9. a. By whom will the course be taught? Heather Bush or David Fardo
- 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?  
5-10 students
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.  
The course will be a requirement for the proposed Ph.D. in Epidemiology/Biostatistics. Some of the students in that program may consider Epidemiology their home department.  
It may be of interest to graduate students from other colleges and to the MPH and Dr.PH students in the College of Public Health.
12. Will the course serve as a University Studies Program course<sup>†</sup>?  YES  NO  
If YES, under what Area? \_\_\_\_\_  
<sup>†</sup>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: PhD in Epidemiology and Biostatistics

## APPLICATION FOR NEW COURSE

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

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

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: Richard Kryscio Phone: 257-4064 Email: kryscio@email.uky.edu

20. Signatures to report approvals:

4-1-08  
DATE of Approval by Department Faculty

Richard Kryscio / Richard Kryscio  
printed name Reported by Department Chair signature

6-26-08  
DATE of Approval by College Faculty

Linda Alexander / Linda Alexander  
printed name Reported by College Dean signature

\* DATE of Approval by Undergraduate Council

\_\_\_\_\_  
printed name Reported by Undergraduate Council Chair signature

\* DATE of Approval by Graduate Council

Brian Jackson / Brian Jackson  
printed name Reported by Graduate Council Chair signature

\* DATE of Approval by Health Care Colleges Council (HCCC)

Heidi Anderson / Heidi Anderson  
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>)

## **BST 760: Advanced Regression Analysis**

**Course Description:** This course provides an introduction to theoretical methods and applications of linear and generalized linear models. Regression methods for normally distributed outcomes will provide a discussion of experimental design, design matrices, and modes of parametric inference for the linear model. Students will learn to apply these concepts in sophisticated data analysis where they will implement tools for model building and selection, variable selection, and handling categorical predictors, confounders and interactions. Additionally, students will learn polynomial regression and flexible alternatives such as weighted least squares and robust, ridge and nonparametric regression. Regression methods for non-normal outcomes (focusing on binomial and count data) will be covered in detail, providing students with foundational tools for understanding and implementing generalized linear models that are commonly used to analyze epidemiologic and public health data from various study designs including but not limited to cohort, case-control, and clinical trials.

**Course Structure:** 3 credit hours (2 hours of lecture, 2 hours of laboratory)

**Prerequisites:** BST 675 (Biometrics I) and STA 580 (or equivalent)

**Co-requisite:** BST 676 (Biometrics II)

**Initial Offering:** Spring 2010

**Instructors:** Any faculty member in the Department of Biostatistics

**Philosophical Statement:** Linear and generalized linear models provide the foundation for regression modeling in epidemiologic and public health research to identify and characterize associations between health outcomes and health predictors. Identification of factors predictive of beneficial or adverse health conditions in a population is a core task in the biosciences, and the methodological, computational, and data analysis components of BST 760 will provide PhD students in biostatistics/epidemiology the fundamental tool for designing and analyzing population health studies.

**Objectives:** Students completing BST 760 will be able to:

- Identify the appropriate applications of linear and generalized linear models;
- Describe the uses and limitations of linear and generalized linear models;
- Utilize linear and generalized linear models in data analysis, along with contrasts and multiple comparisons, under consideration of power and sample size issues;
- Employ model building and diagnostics tools and corrective procedures;
- Understand the methods used to deal with practical problems such as unbalanced data, missing values, co-linearity, correlated data, and departures from model assumptions;
- Use the statistical software packages SAS and R to correctly implement linear and generalized linear model analyses

- Understand the theory behind inferential methods for linear and generalized linear models
- Provide clear and concise interpretations and presentations of the results from linear and generalized linear model analyses.

References:

McCullagh, P. and J.A. Nelder (1989). *Generalized Linear Models*, 2<sup>nd</sup> edition. Chapman and Hall: London.

Kutner MH, Nachtsheim CJ, Neter J, Li W (2005). *Applied Linear Statistical Models*, 5<sup>th</sup> edition. McGraw-Hill/Irwin

Collett D (2003). *Modelling binary data*, 2<sup>nd</sup> edition. Chapman and Hall: London.

Detailed Outline:

1. Experimental Design
  - a. One-way ANOVA
  - b. Two-way ANOVA
  - c. Sample size and power calculations
2. Multiple Linear Regression
  - a. Model Specification
  - b. Overview of matrix arithmetic and operations
  - c. Matrix Formulation and the Design Matrix
  - d. Parametric Inference
3. Multiple Linear Regression: Model Building
  - a. Confounding (ANCOVA)
  - b. Variable Selection
  - c. Interactions
  - d. Types of Sums of Squares
  - e. Polynomial Regression
4. Multiple Linear Regression:
  - a. Diagnostics and Residuals
  - b. Alternatives to MLR
5. Generalized Linear Models
  - a. Link Functions
  - b. Numerical procedures for model fitting
  - c. Asymptotic MLE Theory
  - d. Model selection and diagnostics
6. GLMs for Binary and Categorical Outcomes
  - a. Measures of Association
  - b. Binomial Regression
  - c. Case-Control Studies and Conditional Logistic Regression

- d. Polytomous Logistic Regression
- 7. GLMs for Count Outcomes
  - a. Incidence Rates
  - b. Poisson Regression
  - c. Overdispersion and negative binomial regression
  - d. Alternatives to Poisson Regression

Assessment: There will be data analysis projects (60%) and regularly assigned homework (40%).

Grading Scale:

Grade	%
A	90-100
B	80-89
C	70-79
E	60-69

**LaRoche, Adrea S.**

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**From:** Brothers, Sheila C  
**Sent:** Monday, September 22, 2008 8:42 AM  
**To:** LaRoche, Adrea S.  
**Subject:** FW: HCCC Transmittal - Program Change: MS in Athletic Training  
**Attachments:** PhD Epi Bio Final Signatures.pdf; FW: important--EPI 714; FW: regarding the New Program Proposal for the PhD in Epidemiology and Biostatistics

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

**Categories:** Curricular Items

Don't let the subject line fool you -- this is for a PhD in Epidemiology. ☺  
Sheila

*Office of the Senate Council  
Phone: (859) 257-5872*

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**From:** Lindsay, Jim D.  
**Sent:** Friday, September 19, 2008 2:20 PM  
**To:** Nikou, Roshan; Jackson, Brian A  
**Cc:** Brothers, Sheila C; Anderson, Heidi Milla; Flanagan, Rebecca; Alexander, Linda A; Kryscio, Richard  
**Subject:** RE: HCCC Transmittal - Program Change: MS in Athletic Training

September 19th, 2008

**T R A N S M I T T A L**

**TO:** Brian Jackson, Roshan Nikou  
Graduate Council  
**FROM:** Jim Lindsay  
Health Care Colleges Council

At its August 19th 2008 meeting, the Health Care Colleges Council approved the following proposal and is now forwarding it to the Graduate Council to approve:

College of Public Health  
New Program: Ph.D. in Epidemiology

Attached are the materials to implement the requested action.

cc: Linda Alexander  
Becki Flanagan  
Richard Kryscio  
Shelia Brothers  
Heidi Anderson

Jim Lindsay  
Health Care Colleges Council Coordinator  
Associate Provost for Faculty Affairs Office  
University of Kentucky, 205 Frazee Hall  
Lexington, KY 40506-0031 Ph. (859) 323.6638  
[www.uky.edu/Provost/AcademicCouncil/council.php](http://www.uky.edu/Provost/AcademicCouncil/council.php)



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

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This course is a requirement in the proposed PhD in Epidemiology/Biostatistics.

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Name: Richard Kryscio Phone: 257-4064 Email: kryscio@email.uky.edu

20. Signatures to report approvals:

<p style="font-size: 1.2em; margin: 0;">4-1-08</p>	<p style="font-size: 1.2em; margin: 0;">Richard Kryscio</p>
DATE of Approval by Department Faculty	Reported by Department Chair <span style="float: right; font-size: 0.8em;">signature</span>
<p style="font-size: 1.2em; margin: 0;">6-26-08</p>	<p style="font-size: 1.2em; margin: 0;">Linda Alexander</p>
DATE of Approval by College Faculty	Reported by College Dean <span style="float: right; font-size: 0.8em;">signature</span>
<p style="font-size: 0.8em; margin: 0;">* DATE of Approval by Undergraduate Council</p>	<p style="font-size: 0.8em; margin: 0;">Reported by Undergraduate Council Chair <span style="float: right; font-size: 0.8em;">signature</span></p>
<p style="font-size: 0.8em; margin: 0;">* DATE of Approval by Graduate Council</p>	<p style="font-size: 0.8em; margin: 0;">Reported by Graduate Council Chair <span style="float: right; font-size: 0.8em;">signature</span></p>
<p style="font-size: 1.2em; margin: 0;">8/19/08</p>	<p style="font-size: 1.2em; margin: 0;">Heidi Anderson</p>
* DATE of Approval by Health Care Colleges Council (HCCC)	Reported by Health Care Colleges Council Chair <span style="float: right; font-size: 0.8em;">signature</span>
<p style="font-size: 0.8em; margin: 0;">* DATE of Approval by Senate Council</p>	<p style="font-size: 0.8em; margin: 0;">Reported by Office of the Senate Council</p>
<p style="font-size: 0.8em; margin: 0;">* DATE of Approval by University Senate</p>	<p style="font-size: 0.8em; margin: 0;">Reported by Office of the Senate Council</p>

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  - b. Two-way ANOVA
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