

Nikou, Roshan

From: Graduate.Council.Web.Site@www.uky.edu
Sent: Wednesday, December 03, 2008 10:20 AM
To: Nikou, Roshan
Cc: Price, Cleo
Subject: Investigator Report

AnyForm User: www.uky.edu
AnyForm Document: <http://www.research.uky.edu/gc/GCInvestigatorReport.html>
AnyForm Server: www.uky.edu (/www/htdocs/AnyFormTurbo/AnyForm.php)
Client Address: 76.177.13.44

College/Department/Unit: = BST701
Category:_ = New
Date_for_Council_Review: = 12/4/2008
Recommendation_is:_ = Approve
Investigator: = Kert Viele
E-mail_Address = viele@uky.edu
1__Modifications: =
2__Considerations: = Course appears straightforward and useful. I recommend approval
3__Contacts: = Adam Branscum general discussion
4__Additional_Information: =

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AnyForm/PHP3 0.1

AnyFormRandomSeqNo: 36508096

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 701

b. Title* Bayesian Modeling in Biostatistics

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

Bayesian Biostatistics

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 (1) LABORATORY (2) 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 Bayesian ideas and data analysis applied to the biosciences. The course illustrates current approaches to Bayesian modeling and computation in biostatistics.

h. Prerequisite(s), if any:

required: BST 760 (Advanced Regression) and BST 676 (Biometrics II) or equivalent

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 (KT/teleweb) Other

Please describe "Other": _____

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

4. To be cross-listed as: _____
Prefix and Number Signature of chair of cross-listing department

5. Requested effective date (term/year): Spring / 2011

APPLICATION FOR NEW COURSE

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: This course will be offered once every three semesters.
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? Adam Branscum or Chong Wang
- b. Are facilities for teaching the course now available? ES 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? ES No
- b. Will it be of interest to a significant number of students outside the department? ES NO
If ES, 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.
-
12. Will the course serve as a University Studies Program course[†]? ES NO
If ES, 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 ES No
15. Is this course part of a proposed new program? ES NO
If ES, please name: PhD in Epidemiology and Biostatistics
16. Will adding this course change the degree requirements for ANY program on campus ? ES NO
If ES [†], list below the programs that will require this course:

APPLICATION FOR NEW COURSE

*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: Adam Branscum Phone: 257.1476 Email: abran3@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

Blair A. Marshall / Blair A. Marshall
printed name Reported by Graduate Council Chair signature

8/19/08
* 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

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

BST 701: Bayesian Modeling in Biostatistics

Course Description: This course provides an introduction to Bayesian ideas and data analysis applied to the biosciences. The course illustrates current approaches to Bayesian modeling and computation in statistics. The course will cover the following topics: Bayesian philosophy, prior, posterior and predictive distributions and inference, one and two population models based on normal, binomial, Poisson, and survival distributions, conjugate, informative, and reference prior distributions, linear and generalized linear models, survival analysis, ANOVA, missing data, diagnostics and model selection, aspects of modern Bayesian computational methods including Markov chain Monte Carlo methods (Gibbs sampler and Metropolis Hastings algorithm) and their implementation and monitoring, with applications to biomedical data analysis.

Course Structure: 3 credit hours (2.5 hours of lecture, 1 hour of laboratory)

Prerequisites: BST 760 (Advanced Regression) and BST 676 (Biometrics II) or equivalent.

Initial Offering: Spring 2011

Philosophical Statement: Statistical models are developed for the purpose of addressing scientific questions. For each scientific question that is posed and for which data are collected, the truth is sought by developing statistical models that are useful in this regard. Bayesian statistics represents one of the major approaches to the whole of statistical modeling. Through hands-on experience with real data from a variety of applications, students will learn the basics of designing and carrying out Bayesian analysis, and interpreting and communicating the results. BST 701 will provide students an introduction to practical Bayesian methods for biostatistics data analysis, and illustrate the utility of the Bayesian philosophy in public health. While aimed at biomedical scientists, the methods presented apply to all disciplines in which data are collected to address scientific hypotheses. BST 701 has methodological, computational, and data analysis components. Although statistical methodology will be presented to the extent needed for students to understand the models and methods, the course emphasizes practical applications over theory.

Objectives: On successful completion of the course, students will be able to

1. understand the Bayesian approach to statistical data analysis and how it compares to other modes of statistical inference
2. design, develop and implement Bayesian methods to address biomedical hypotheses
3. incorporate prior information into statistical inferences
4. make posterior inferences on parameters of scientific interest
5. conduct Bayesian analyses of complex biostatistics data sets
6. create WinBUGS programs to fit Bayesian models
7. interpret and communicate results from Bayesian data analysis

References: Lecture notes will be provided by the instructor. One of the following may be used as the official textbook:

1. Gelman, A, Carlin, J, Stern, H, Rubin, D (2004). *Bayesian Data Analysis*. Chapman & Hall.
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Detailed Outline:

I. Fundamentals of Bayesian Biostatistics

Why Bayesian statistics? Approaches to statistical inference and an overview of Bayesian ideas

Probability review

Prior distributions

Likelihood

Bayesian inference: point and interval estimation, hypothesis testing, prediction

Single parameter models: binomial data, Poisson data, normal data

Two sample problems

Comparing means, proportions, rates, median survival times

Effect measures: relative means, mean difference, odds ratio, risk ratio, risk difference, rate ratios, and median time to event, survival probabilities

Multivariate normal models, Wishart distribution and Jeffreys' prior

Introduction to the WinBUGS software

II. Bayesian Computation

Monte Carlo integration, Law of Large Numbers, asymptotic approximations

Markov chain Monte Carlo (MCMC) algorithms: Gibbs sampling, Metropolis-Hastings

Adaptive rejection sampling

Slice sampling

WinBUGS for Gibbs sampling

Convergence monitoring and diagnosis: multiple starting values, Gelman-Rubin diagnostic, autocorrelation function, thinning, initial values

Inference from MCMC: method of composition, credible intervals, HPD intervals, posterior density estimation, posterior errors.

III. Bayesian Regression

Likelihood construction

Normal regression: Bayesian linear model

Bayesian ANOVA and MANOVA

Bayesian Generalized Linear Models

Logistic regression

Poisson regression

Negative binomial regression
Bayesian residuals
Survival Analysis
 Cox proportional hazards models
 Accelerated failure time models
Prior distributions: Data augmentation priors and conditional means
priors
WinBUGS implementations

IV. Model Selection

Bayes information criterion (BIC)
Deviance information criterion (DIC)
Bayes factors
Savage-Dickey ratio
Pseudo marginal likelihoods and Bayes factors
Bayesian model averaging
Reversible jump MCMC
Predictive model selection

Assessment: Grades will be based on problem sets and lab assignments (50%), a final examination (25%) and class project (25%).

Grading Scale:

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

LaRoche, Adrea S.

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*

From: Lindsay, Jim D.
Sent: Friday, September 19, 2008 2:20 PM
To: Nikou, Roshan; Jackson, Brian A
Cc: Brothers, Sheila C; Anderson, Heidi Millia; 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

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