**New Course Request**

**Indiana University**

**Indianapolis Campus**

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<th>Check Appropriate Boxes:</th>
<th>Undergraduate credit [ ]</th>
<th>Graduate credit [ ]</th>
<th>Professional credit [ ]</th>
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</table>

1. **School/Division**: Medicine | Public Health

2. **Academic Subject Code**: PBHL

3. **Course Number**: B642 (must be cleared with University Enrollment Services)

4. **Instructor**: GAo

5. **Course Title**: Applied Survival Analysis for Public Health

   **Recommended Abbreviation (Optional)**: Applied Survival Only for PH

   (Limited to 22 Characters including spaces)

6. **First time this course is to be offered (Semester/Year)**: Spring 2011

7. **Credit Hours**: Fixed at 3 or Variable from 0 to 0

8. **Is this course to be graded S-F (only)**? Yes [ ] No [ ]

9. **Is variable title approval being requested**? Yes [ ] No [ ]

10. **Course description (not to exceed 50 words for Bulletin publication)**: The statistical methods covered in this course focus on "time to event" data, where the event can be response to treatment, relapse of disease, or death. Topics covered in this course include estimation of survival function and regression models for survival data. Specifically, this course covers the central functions of survival analysis: the hazard, survival and cumulative hazard functions, non parametric estimation of survival functions using life-table method and the Kaplan-Meier method. Prereq: One course in Basic Stats & Linear Regression Models.

11. **Lecture Contact Hours**: Fixed at 3 or Variable from 0 to 0

12. **Non-Lecture Contact Hours**: Fixed at 0 or Variable from 0 to 0

13. **Estimated enrollment**: 30 of which 100 percent are expected to be graduate students.

14. **Frequency of scheduling**: one time per year Will this course be required for majors? Yes

15. **Justification for new course**: Necessary component for the development of the Biostatistics concentration curriculum.

16. **Are the necessary reading materials currently available in the appropriate library**? Yes

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.**

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**Submitted by:**

**Carole Kaciw**

Department Chairman/Division Director

Date 5.5.10

**Approved by:**

**Jetta V. Calvino**

Dean

Date 6.8.2010

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Dean of Graduate School (when required)

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Chancellor/Vice-President

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University Enrollment Services

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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.

**University Enrollment Services**

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Department/Division—Pink; University Enrollment Services Advance—White

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INDIANA UNIVERSITY SCHOOL OF MEDICINE
DEPARTMENT OF PUBLIC HEALTH
Spring, 2011

COURSE TITLE: Applied Survival Analysis for Public Health
COURSE NUMBER: B642
LOCATION: TBD
DATE: TBD

FACULTY: Sujuan Gao, Ph.D.
Professor
Division of Biostatistics
Department of Medicine
HT 3007
Phone: 274-0820
E-mail: sgao@tupui.edu
Office Hours: TBD

COURSE DESCRIPTION The statistical methods covered in this course focus on "time
to event" data, where the event can be response to treatment, relapse of disease, or death.
Topics covered in this course include estimations of survival function and regression
models for survival data. Specifically, this course covers the central functions of survival
analysis: the hazard, survival, and cumulative hazard functions, nonparametric estimation
of survival functions using life-table method and the Kaplan-Meier method, and
comparison of survival distributions using the log-rank and other tests. In addition, we
will discuss regression models for survival outcomes with emphasis on the Cox
proportional hazards model. Alternative models such as the accelerated failure time
model and use of parametric distributions (exponential, Weibull) will also be considered.
Class material will include presentation of statistical methods for estimation and testing,
along with current software (SAS) for implementing analyses of survival data.
Applications to real data will be emphasized.

Prerequisites: Students must have taken PBHL P551 (Biostatistics-Public Health I) and
PBHL B641 (Linear Models in Public Health). Students need to have prior knowledge of
SAS for completion of homework.

MPH PROGRAM COMPETENCIES ADDRESSED IN THIS COURSE
• Apply common statistical methods for inference.
• Apply descriptive and inferential methodologies according to the type of study
design for answering a particular research question.
• Interpret results of statistical analyses found in public health studies

LEARNING OBJECTIVES
At the completion of this course, students will be able to:
• Analyze and interpret survival data
• Understand the types of analysis and their uses
• Employ SAS to conduct analysis for survival data.

REQUIRED OR SUGGESTED TEXT AND/OR READINGS
Chapman & Hall. ISBN 1584883251

EVALUATION AND GRADING SCALE
Course objectives will be assessed with homework assignments and two examinations. Class materials and homework assignments will be posted on Oncourse. The homework will consist of take-home assignments using SAS. You are allowed to discuss course materials including homework with classmates; however, you must perform the analysis yourself and complete the assignment independently. No late homework will be accepted.

Exams will contain a mixture of multiple choice items, fill-in-the-blank items, and computer printouts for you to interpret. Exams will be “open book”, meaning that you can use lecture notes, your own notes, books and calculator. However, cell phone, pager or networked devices will not be allowed during exams.

Make-up examinations will be given only in extraordinary situations (such as serious illness) and can be arranged after receiving prior consent from the instructor.

The final course grade will be determined using the following weighting scheme:

- Homework 50%
- Exam 1 25%
- Exam 2 25%

GUIDELINES (Optional; Specific to the Class, i.e. Building Security Information)

ATTENDANCE (To be developed by individual faculty)

STUDENTS WITH DISABILITIES

Students needing accommodations because of disability will need to register with Adaptive Educational Services (AES) and complete the appropriate forms issued by AES before accommodations will be given. The AES office is located in CA 001E and you can reach the office staff by calling 274-3241.

STUDENT COURSE EVALUATION

The Department of Public Health evaluates all courses. Student course evaluations will be conducted in a manner that maintains the integrity of the process and the anonymity of respondents.

ACADEMIC INTEGRITY

Academic and personal misconduct by students in this class are defined and dealt with
according to the procedures in the Student Misconduct section of the IUPUI Code of Student Rights, http://live.iupui.edu/dos/code/htm.

(Optional: Wording on how the faculty member handles plagiarism in this class is placed at this point in the syllabus.)

CLASS SCHEDULE (e.g. class meeting dates, topics, lecturer, learning objectives for each lecture, reading assignments, homework due dates, exam dates)

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<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Reading Assignment</th>
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| 1    | Review I  
• Probability and probability functions  
• Distributions of sample statistics  
• Central Limit Theorem  
• maximum likelihood methods |  |
| 2    | Introduction to Survival Data  
• Special features of survival data,  
• censored data,  
• examples of survival data,  
• survival function and hazard function | Chapter 1 |
| 3 & 4 | Estimating survival and hazard functions  
• Life table estimate  
• Kaplan-Meier estimate | Chapters 2.1 – 2.4 |
| 5    | Comparison of two groups  
• Log-rank test,  
• Wilcoxon test, | Chapter 2.5 |
| 6    | Comparisons of multiple groups  
Stratified tests  
Log-rank test for trend | Chapters 2.6-2.8 |
| 7    | Modeling survival data  
• Cox’s proportional hazard model  
• Model set up | Chapters 3.1-3.2 |
| 8    | Midterm Exam |  |
| 9    | Cox’s proportional hazard model  
• Likelihood function  
• Parameter estimate and inference  
• Interpretations | Chapters 3.3, 3.4 and 3.7 |
| 10   | Cox’s proportional hazard model  
• Estimating the hazard and survival functions | Chapter 3.8 |
| 11   | Cox’s proportional hazard model  
• Model selection procedures | Chapter 3.6 |
| 12   | Model diagnostic procedures  
• Residuals and plots | Chapter 5 |
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<tr>
<td>13</td>
<td>Other survival models</td>
<td>Chapter 4 &amp; Chapter 6.3</td>
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<td>The Weibull model</td>
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<td>The accelerated failure time model</td>
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<td>Time dependent covariates</td>
<td>Chapters 7 &amp; 8</td>
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<td>Interval censored data</td>
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<td>Survival data in observational studies</td>
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<td>Additional topics</td>
<td>Lecture note &amp; Chapter 10.3</td>
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<td>Multiple failure time</td>
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<td>Informative censoring</td>
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<tr>
<td>16</td>
<td>Final Exam</td>
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