

**Graduate School of Public Health**  
**Educational Policies and Curriculum Committee**  
**June 7, 2018**  
**1:30-3:30pm**  
**1149 Public Health**

1. New Course: BOST 2048, Rob Krafty
2. New Course: BOST 2050, Abdus Wahed
3. Report from the MPH committee, Martha Terry
4. New Course: BCHS XXXX, Stina Mair
5. Discussion I of II on the optional school diversity statements for syllabi, in conjunction with the FDC, Ryan Minster (FDC member)
6. Discussion I of II of a Title IX sexual misconduct/ awareness statement for syllabi, in conjunction with the FDC, Ryan Minster (FDC member)
7. Proposed revision and discussion to the school required academic integrity statement for syllabi, Patricia and Robin
8. Proposed revision and discussion to the requirements for EPCC members, Patricia and Robin
9. Update and discussion on test optional policies, including an upcoming ASPPH webinar on holistic admissions, Patricia and Robin
10. Approval of May 3 Meeting Minutes, All
11. Update to committee members, Patricia and Robin
12. Scheduling fall term meetings, All
13. Closed session: Spring 2018 Term Student Record Review (open only to voting members)

Upcoming meetings:

July 26, 1:30-3:30pm, room 1149 | Deadline for new fall 2018 courses



# University of Pittsburgh

*Graduate School of Public Health  
Department of Biostatistics*

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May 31, 2018

Subject: New Courses – BIOS 2048 & 2050

Dear EPCC Members:

Attached are the syllabus and EPPC Course Forms to propose two new courses starting in fall 2018: BIOS 2048 Biostatistical Methods and BIOS 2050 Longitudinal and Clustered Data Analysis. This is part of a larger restructuring of the biostatistics curriculum, which was discussed at the February 2018 EPCC meeting.

The broad goal of this collection of changes is to streamline the curriculum and enable students to have a more tailored and modern educational experience. More specifically, the curriculum is being restructured to address two primary issues: (I) the vast diversity of students in BIOS 2041 Introduction to Statistical Methods 1 in terms of skill and individual learning objectives and (II) a tremendous amount of overlap and desynchronization in the material covered in BIOS 2042 Introduction to Statistical Methods 2, BIOS 2049 Applied Regression Analysis, and BIOS 2046 Analysis of Cohort Studies.

- (I) The proposed course BIOS 2048 will address the first issue. This new course offers a different path for introductory statistics that will be more mathematical compared to BIOS 2041. The material for BIOS 2041 will remain at the level of and be based on the course notes used by Dr. Morton over the past several years. BIOS 2048 will be a required course for all biostatistics students and could be an alternative to BIOS 2041 for more quantitatively geared students who have had two calculus courses in the past. It should be noted that, in response to both formal and informal student feedback, the text book that was previously used for BIOS 2041 (Rosner) will be replaced with a more appropriate text (Triola, Triola and Roy) and that Rosner will be used for BIOS 2048. I will bring copies of the texts to the meeting for viewing and am attaching the syllabus for BIOS 2041 to show the change in text.
- (II) The proposed course BIOS 2050 will, in part, address the second issue. The course BIOS 2046 covered material including generalized linear models, mixed models and GEE. Generalized linear models will now be covered in BIOS 2049; the proposed BIOS 2050 is a 2 credit course specifically dedicated to mixed models, GEE and other methods for the analysis of longitudinal and clustered data. The prerequisite for BIOS 2050 is BIOS 2049.

It should be noted that BIOS 2042 and BIOS 2046 will no longer be offered. The material previously covered in the sequence BIOS 2041/2042 will now be covered by either the sequence BIOS 2041/2049 or BIOS 2048/2049. The prerequisite for BIOS 2049 will be either BIOS 2041 or BIOS 2048. The remaining material that was previously covered in BIOS 2046 and is not covered in the more encompassing BIOS 2049 will be covered in BIOS 2050. The EPCC request for these changes to BIOS 2049 will be submitted early in the fall.

Sincerely,

A handwritten signature in black ink, appearing to read 'RTK', with a long horizontal flourish extending to the right.

Robert T. Krafty  
Associate Professor of Biostatistics  
rkrafty@pitt.edu

**Educational Policies and Curriculum Committee**  
**Graduate School of Public Health**  
**University of Pittsburgh**  
**(Revised: 9/22/2015)**

**REQUEST FOR APPROVAL OF NEW COURSES AND COURSE CHANGES**

1. **General Instructions:**

- a. Faculty should submit this form and the associated syllabus following the Pitt Public Health Syllabus Guidelines and the Syllabus Checklist (on pages 4 and 5) **by e-mail** to Patricia Documet, Chair ([pdocumet@pitt.edu](mailto:pdocumet@pitt.edu)) and Robin Leaf, EPCC Staff Liaison ([ral9@pitt.edu](mailto:ral9@pitt.edu)). If you choose not to include all the information detailed on the Syllabus Guidelines in your course syllabus for distribution to students, please attach this information to the proposal.
- b. The initiating Department is asked to submit one hard copy of this completed form with the proper signatures, syllabus and other materials (if any) to Robin Leaf in Student Affairs **at least one week prior** to the EPCC meeting. If this target date is not met, the proposal will be deferred for consideration at the next meeting scheduled.
- c. You will be contacted by the EPCC Chair or the EPCC Staff Liaison to schedule a presentation and discussion of your program/course proposal with the Committee, if possible at the next scheduled EPCC meeting.

2. **Review based on the following (check all which apply):**

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> New course, not previously approved | <input type="checkbox"/> Course modification (major)            |
| <input type="checkbox"/> Course title change                            | <input type="checkbox"/> Special topics course content          |
| <input type="checkbox"/> Cross-listing only                             | <input type="checkbox"/> Pitt Public Health Core Course         |
| (Specify academic unit & course number): _____                          | <input type="checkbox"/> Practicum, internship, field placement |

3. **Course designation:**

Course Number BIOS 2048 Title Biostatistical Methods Credits 3

4. **Cross-listing:**

If you want to cross-list this course in any other Pitt Public Health department or any other school of the University, specify which department(s) and School(s) and provide brief justification.

None

5. **Course Instructors:**

(Indicate type of Pitt Public Health faculty appointment,\* and percentage of total course time/effort anticipated. For any instructor who does not hold a Pitt Public Health faculty appointment, indicate her/his title and affiliation.)

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\* The principal instructor for any Pitt Public Health course must have a primary, secondary or adjunct appointment in the school.

a. Principal instructor:

The Department of Biostatistics is in the process of hiring a new assistant professor within the public health education track. This new faculty member will be the instructor for 100% of this course.

b. Co-instructors (if any):

6. **Statement of the course for *Course Inventory*.** Include purpose of course; summary of prerequisites, if any; general course content; and method of conducting course (e.g., lecture, laboratory, field work, etc.).

This course is an introductory biostatistics methods course for biostatistics graduate students, other quantitative public health students, and health career professionals who will make use of statistical methods in research projects, interpreting literature and possibly develop new biostatistical methods in the future. This class is intended for students needing a more research-oriented approach than that provided in BIOST 2011 and an approach with a greater emphasis on mathematical foundation than provided in BIOST 2041. Students in BIOST 2048 are expected to have a working knowledge of calculus, including multivariable differentiation and integration. Topics covered in this course include exploratory and descriptive analyses, probability, estimation and hypothesis testing. One and two sample problems will be considered for both continuous and discrete variables. ANOVA, regression, correlation and nonparametric methods will be discussed. R will be used extensively for data analysis.

Pre-requisite: Enrolled in the Biostatistics MS or PhD degree programs, or permission of the instructor.

7. **Student enrollment criteria/restrictions:**

- a. Indicate any maximum or minimum number of students and provide justification for this limitation.

Maximum 30 students.

As an introductory methods course with an objective of understanding foundation in addition to implementation, the maximum number of students must be limited to ensure sufficient in-class interaction.

- b. If admission is by permission of instructor, state criteria to be applied.

Admission will be by permission of instructor if the student is not enrolled in the MS or PhD programs in biostatistics.

Permission will be granted on the basis of a student having had at least 2 calculus courses. As this is a pre-requisite for admission into the biostatistics MS and PhD programs, students in those courses will be allowed to register without permission.

- c. Provide a brief description of any prerequisite skills or knowledge areas that are necessary for students entering this course, including any specific course prerequisites or equivalents.

Students will be required to have a working knowledge of multivariable differentiation and integration. This will be assessed by having taken two semesters of calculus.

8. **Course schedule and allocation of hours:**

- a. Number of course hours per session 1hr 25min\_ Sessions per week \_2\_ Weeks per academic term \_16\_  
b. Approximate allocation of class time (hours or %) among instructional activities:

Lectures 100% Seminars \_\_\_\_\_ Recitations \_\_\_\_\_ Field work \_\_\_\_\_ Laboratory \_\_\_\_\_  
Other (specify): \_\_\_\_\_

c. Term(s) course will be offered: Fall X Spring \_\_\_\_\_ Summer Term \_\_\_\_\_ Summer Session \_\_\_\_\_

9. **Grading of student performance:**

Indicate the grading system to be used (A, B, C, etc.; H, S, U); provide statement justifying use of system other than letter grade.

Letter grading – A, B, C, ect.

10. **On-line course delivery:**

Indicate the extent to which you will be using on-line instructional methods in teaching this course by checking all of the options below which apply:

X I plan to use the course management aspects of CourseWeb/ Blackboard (or equivalent), e.g., grade book, announcements.

\_\_\_\_\_ I plan to use the interactive features of CourseWeb/Blackboard (or equivalent), e.g., discussion board, etc.

\_\_\_\_\_ I have designed the course for remote (off-site) learning with little/no classroom attendance required.

\_\_\_\_\_ I do not plan to use on-line instruction methods for this course (briefly explain)

11. **Relevance of course to academic programs and curricula:**

a. Describe how this course contributes to learning objectives specified for the curriculum of one or more Pitt Public Health degree or certificate programs. Indicate whether course is required for any specified degree or certificate.

This course is a required course for the MS and PhD Programs in Biostatistics. These programs emphasize statistical theory, methods and application to enable students to be effective statistical collaborators in interdisciplinary studies, to lead the design and execution of studies, and for the PhD program, to develop new biostatistical methodology. This course provides students with a firm background in biostatistical methods.

b. Describe how this course addresses public health issues involving diversity (gender, race, ethnicity, culture, disability, or family status).

The course will use data from public health studies to illustrate methodological concepts, and demonstrate appropriate approaches for formal analysis, interpretation and reporting. Included will be studies that collect information on gender, race and ethnicity. The analyses of data from such studies will give students the ability to assess effects of and to control for variables associated with diversity when analyzing data.

12. **Signature and date of principal faculty member (include department/program) making request:**

Name/Title: 

Date: May 30, 2018

13. **Signature and date of endorsement of department chairperson:**

Name/Title: 

Date: May 30, 2018

14. (For cross-listing only)

**Signature and date of endorsement of department chairperson:**

Name/Title: \_\_\_\_\_

Date: \_\_\_\_\_

**Educational Policies and Curriculum Committee  
Graduate School of Public Health  
University of Pittsburgh  
(11/19/2013)**

**SYLLABUS CHECKLIST FOR NEW AND REVISED COURSES**

**Addendum to REQUEST FOR APPROVAL OF NEW COURSES AND COURSE CHANGES FORM**

*Objective to assist faculty to ensure syllabus contains the required and necessary elements  
to provide students with clear expectations of the course.*

NOTE: \* indicates a required element of the syllabus. If N/A is checked or this element is not included  
complete the information detailed on page two for all instances.

Syllabus Area	Recommended Detail * Required	Included in Your Syllabus?					
<i>Heading</i>	Course Number*	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Course Title*	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Course Meeting Time/Day of Week*	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Classroom Location*	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
<i>Faculty Information</i>	Office Location*	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Office Hours*	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Phone Number*	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Email Address*	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Teaching Philosophy	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>	N/A	<input type="checkbox"/>
	Teaching Assistant Contact	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
<i>Student Expectations in Classroom</i>	Behavior/ Ground Rules (cell phones off, laptops off, etc.)	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>	N/A	<input type="checkbox"/>
	Recording of Lectures	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>	N/A	<input type="checkbox"/>
<i>Course Summary</i>	Course Description*	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Learning Objectives*	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
<i>Materials</i>	Required Textbooks/ Articles/Readings	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Required Software	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Required Equipment (including use of CourseWeb/Blackboard)	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Recommended Material	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Availability of Software for Purchase and/or Use	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>





University of Pittsburgh  
*Graduate School of Public Health*

## **Biostatistics 2048 ~ Fall 2018**

### **Biostatistical Methods**

Instructor:	TBD	
Email:	TBD	
Office:	TBD	
Office Hours:	TBD	
Lecture Times:	Tuesdays & Thursdays, 9:30am-10:55am	
Lecture Location:	Public Health A522	
Teaching Assistants:	TBD	TBD
Email:	TBD	TBD
Office:	TBD	TBD
Office Hours:	TBD	TBD

#### **Course Prerequisites, Description and Goals:**

BIOST 2048 is an introductory applied biostatistics course for biostatistics graduate students, other quantitative public health students, and health career professionals who will make use of statistical methods in research projects, interpreting literature and possibly develop new biostatistical methods in the future. This class is intended for students needing a more research-oriented approach than that provided in BIOST 2011 (Principles of Statistical Reasoning) and an approach with a greater emphasis on mathematical foundation than provided in BIOST 2041 (Introduction to Statistical Methods I). Students in BIOST 2048 are expected to have a working knowledge calculus including, multivariable differentiation and integration.

Topics covered in this course include exploratory and descriptive analyses, both quantitative and graphical. Probability is discussed, including sample spaces, probability measures, probability calculus, and popular continuous and discrete distributions. Estimation and hypothesis testing are discussed in detail for one- and two-sample problems for both continuous and discrete data. One-way ANOVA, ANCOVA, simple linear regression and correlation methods are explored. Nonparametric and computationally intensive resampling and simulation-based methods are discussed in addition to classical parametric approaches. Broad goals include: the use of R to analyze data sets and answer research questions; recognition of situations when procedures are and are not appropriate; and intuitive understanding of the rationale used in creating the statistical procedures presented.

#### **Specific Course Objectives**

At the conclusion of this course, a student should be able to

1. Distinguish among different data types and be able to identify appropriate statistical procedures.
2. Use R to manage data and to perform statistical analyses.
3. Distinguish between population parameters and estimates.
4. Describe the foundations of statistical inference, construct and interpret confidence intervals and hypothesis tests.
5. Identify, implement and interpret standard procedures including:
  - a. hypothesis tests and confidence intervals for means of continuous, binary, and count data.
  - b. contingency table analyses for two categorical variables.
  - c. correlation and simple linear regression for associations between continuous variables.

- d. ANOVA and ANCOVA for associations between categorical and continuous variables.
6. Identify when assumptions of standard procedures are violated and apply appropriate nonparametric methods, including rank-based, permutation and bootstrap based inference.
7. Conduct power and sample size calculations.

### **Pre-Requisites**

There are no formal pre-requisites. However, students are expected to have had two semesters of calculus.

### **Credit hours: 3**

### **Required Textbook**

Bernard Rosner, Fundamentals of Biostatistics, 8<sup>th</sup> edition, Cengage, 2016

### **Additional Optional Textbooks**

[Note: Both of these books can be accessed for free through the University Library]

Michael Crawley, The R Book, 2<sup>nd</sup> edition, Wiley, 2012

Babak Shahbaba, Biostatistics with R, Springer, 2012

### **Software**

This course will use R for data management and computation. Students should have access to a laptop or desktop computer that has internet availability and access to the latest version of R. The latest version of R can be downloaded for free at <https://cran.r-project.org/>. Machines within the Pitt Public Health Computer Laboratory have the most current version of R loaded. Students who are using their own machine are also encouraged to download R Studio (<https://www.rstudio.com>), an integrated development environment for R.

### **Other material**

Extensive Class Notes will be distributed via CourseWeb

### **Grading**

Course grades will be based on the weighted average of:

Homework	25%
Midterm Exam I	25%
Midterm Exam II	25%
Final Exam	25%

Course grades will be assigned based on the following minimal scale. Note that this is a minimal scale and, in certain circumstances, grades can be curved up.

[93%, 100%]	A;	[90%, 93%)	A-;		
[87%, 90%)	B+;	[83%, 87%)	B;	[80, 83)	B-;
[77%, 80%)	C+;	[73%, 77%)	C;	[70, 73)	C-;
[67%, 70%)	D+;	[63%, 67%)	D;	[60, 63)	D-;
< 60%	F				

### **Exams:**

There will be three exams (two midterms and a final). Exams are closed book. For each exam, students are allowed to use a calculator (no computers, phones, tablets or other devices with internet capabilities can be used), and one standard 8.5"x11" sheet of paper of handwritten notes/formulas. Exams will test students on material covered up until the exam date. Below are the dates of each exam and anticipated topics

Midterm 1: Thursday, October 10, 2018  
Midterm 2: Thursday, November 8, 2018  
Final: Thursday, December 13, 2018

**Homework:**

Weekly homework assignments will be given, except on exam weeks. Typically, homework will be posted on Thursday night and be due in class the following Thursday. Any computations that require the use of statistical software should be done using R, unless explicitly stated otherwise. A student's lowest homework score will be dropped when computing his/her final homework score.

**Important Administrative Dates:**

Tuesday, August 28 – First day of class  
Friday, September 7 – Add/drop period ends  
Tuesday, October XX – No Class (Fall Break)  
Thursday, November 22 – No Class (Thanksgiving)  
Thursday, December 13 – Final exam

**Academic Integrity Statement:** All students are expected to adhere to the school's standards of academic honesty. Any work submitted by a student for evaluation must represent his/her own intellectual contribution and efforts. The Graduate School of Public Health's policy on academic integrity, approved by EPCC on 10/14/08, which is based on the University policy, is available online in the Pitt Public Health Academic Handbook ([www.publichealth.pitt.edu/home/academics/academic-requirements](http://www.publichealth.pitt.edu/home/academics/academic-requirements)). The policy includes obligations for faculty and students, procedures for adjudicating violations, and other critical information. Please take the time to read this policy.

Students committing acts of academic dishonesty, including plagiarism, unauthorized collaboration on assignments, cheating on exams, misrepresentation of data, and facilitating dishonesty by others, will receive sanctions appropriate to the violation(s) committed. Sanctions include, but are not limited to, reduction of a grade for an assignment or a course, failure of a course, and dismissal from the school.

All student violations of academic integrity must be documented by the appropriate faculty member; this documentation will be kept in a confidential student file maintained by the Office of Student Affairs. If a sanction for a violation is agreed upon by the student and instructor, the record of this agreement will be expunged from the student file upon the student's graduation. If the case is referred to the Pitt Public Health Academic Integrity Hearing Board, a record will remain in the student's permanent file.

**Disability Services:** If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services, 216 William Pitt Union (412.648.7890 or TTY 412.383.7355), as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course. A comprehensive description of the services of that office can be obtained at [www.drs.pitt.edu](http://www.drs.pitt.edu).

## Tentative Schedule

The first meeting of this class will be Tuesday, August 28, and the last meeting will be the final exam on Thursday, December 13. The following page has a *tentative* schedule of topics, activities, assignments, and quizzes throughout the semester.

<b>CLASS MEETING</b>	<b>TOPIC</b>		<b>BOOK</b>
Tu, 08/28/2018	Introductions/Data	Course Introduction	
Th, 08/30/2018	Descriptive Statistics	Measures of central tendency and variability Presentations of distributional shape Exploration of relationships Exploring Data Quality	CH1 CH2
Th, 09/06/2018	Probability and Random Variables	Independent outcomes and conditional probability Mutually exclusive outcomes Random variables (RV) Probability mass functions Cumulative distribution functions Expected values and variances of RV	3.1-3.7 4.1-4.6 5.1, 5.2
Tu, 09/11/2018			
Th, 09/13/2018	Probability Distributions	Calculating probabilities, expected value, and variance for Binomial and Poisson random variables Review of empirical rule Normal distribution as a continuous probability distribution Normal distribution Standard normal distribution Normal approximations	4.8-4.12 4.3-5.5 5.7-5.8
Tu, 09/18/2018			
Th, 09/20/2018	Estimation and Inference	Sampling Distribution Point and interval estimation Estimation of the mean, variance, and proportion	6.6-6.8
Tu, 09/25/2018	One-sample inference	Hypothesis testing Errors in hypothesis testing Power and sample size estimation One-sample test for mean, variance, and proportion	7.1-7.9
Th, 09/27/2018			
Tu, 10/02/2018	Review for Exam 1		
Th, 10/04/2018	Exam 1		CH1-7
Tu, 10/09/2018	Fall Break		
Th, 10/11/2018	Two-sample inference	Inference and estimation for 2 samples Paired vs. independent samples Two sample tests for mean, variance, and proportion Outliers	8.1-8.7 8.10 10.1-10.2
Tu, 10/16/2018			
Th, 10/18/2018			

<b>CLASS MEETING</b>	<b>TOPIC</b>		<b>BOOK</b>
Tu, 10/23/2018	ANOVA	One-way ANOVA Multiple comparisons Two-way ANOVA	12.1-12.5
Th, 10/25/2018			
Tu, 10/30/2018	Chi-Square	Chi-square test for goodness of fit Chi-square test for independence Kappa	10.6-10.8
Th, 11/01/2018			
Tu, 11/06/2018	Review for Exam 2		
Th, 11/08/2018	Exam 2		CH8,10,12
Tu, 11/13/2018	Regression and Correlation	Correlation definition Simple linear regression Multiple regression Partial, multiple, and rank correlation	CH11 13.7 14.8
Th, 11/15/2018			
Tu, 11/20/2018			
Th, 11/22/2018	Thanksgiving Break		
Tu, 11/27/2018	Non-Parametric Statistics	Sign test Wilcoxon sign-rank & rank sum test Kruskal Wallis Exact tests	9.1-9.4 12.7
Th, 11/29/2018			
Tu, 12/04/2018	Cluster Analysis	K-means, Hierarchical Clustering	Shahaba Ch12
Tu, 12/11/2018	Overview/Review		
Th, 12/13/2018	Final Exam		CH9-CH12

**BIOST 2041**  
**Introduction to Statistical Methods 1**  
**Fall 2018**

**Instructor:**

TBD

**Office Hours:**

TBD

**Teaching Assistants (TAs):**

TBD

**Text:**

Required:

*Biostatistics for the Biological and Health Sciences*; 2nd edition, 2018 by Marc M. Triola, Mario F. Triola, and Jason Roy

Recommended:

*Data Analysis with Stata*; 2015, by Swizec Teller.

[Note: This text can be read online through the University of Pittsburgh Library]

**Software:**

Stata Version 14, version SE. Please procure from the University Software Download Service on my.pitt.edu prior to class beginning.

**Class Meetings:**

Mondays and Wednesdays, 4:00 – 5:25 PM

Graduate School of Public Health G23

**Important Dates:**

Monday, August 27 – First day of class

Monday, September 3 – No class (Labor Day)

Friday, September 7 – Add/drop period ends

Monday, October XX – No class (fall break)

Tuesday, October XX – Class is held (regularly scheduled Monday classes are held)

Wednesday, December 12 – Final exam

**Recitations:**

Class recitations will be held after lecture (5:30 PM to 6:25 PM) on Mondays. We will occasionally cancel recitation depending on the class progression. The first recitation will be xxxx.

**Course website:**

All class material will be placed on Courseweb. Please check regularly.

The Courseweb announcement mechanism will be used to send messages about class. Only in the event of a time-dependent event (e.g., class canceled due to weather), will an email be sent out to the class. Course-related email will be sent to your “pitt.edu” address *only*.

**Course Prerequisites, Description and Goals:**

BIOST 2041 is an introductory applied biostatistics course for public health students and health career professionals who will make use of statistical methods in research projects or in interpreting literature. This class is for students needing a more research-oriented approach than that provided in BIOST 2011 (Principles of Statistical Reasoning) and **not requiring the level of mathematical detail that is provided in BIOS 2048** (Biostatistical Methods). The prerequisite is college level algebra.

The overall purpose of this course is to introduce students to basic probability and one and two sample procedures (point and interval estimation and hypothesis testing) for continuous and discrete distributions. Basic one and two sample nonparametric tests are also presented. An introduction to simple linear regression and one and two-way ANOVA are also included. This broad goal includes use of statistical software to analyze data sets and answer research questions; recognition of situations when these procedures are *and are not* appropriate; and intuitive understanding of the rationale used in creating the statistical procedures presented.

**Course Learning Objectives/Competencies:**

At the conclusion of this course, a student should be able to:

1. Select quantitative data collection methods appropriate for a given public health context (CEPH Evidence-based Approaches to Public Health Competency #2).
2. Describe basic concepts of probability, random variation, and commonly used statistical probability distributions.
3. Describe preferred methodological alternatives to commonly used statistical procedures when assumptions are not met.
4. Distinguish among the different measurement scales and the implications for selection of statistical methods to be used based on these distinctions.
5. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate (CEPH Evidence-based Approaches to Public Health Competency #3). To include:
  - a. Apply descriptive techniques commonly used to summarize public health data.
  - b. Apply common statistical methods for inference.
  - c. Apply basic regression methodology.
  - d. Apply descriptive and inferential methodologies according to the type of study design for answering a particular research question.

6. Interpret results of data analysis for public health research, policy or practice ((CEPH Evidence-based Approaches to Public Health Competency #4).

### **Course Policies:**

1. All work submitted on homework and exams must be your own. For homework, we encourage you to work together to solve the problems. When you write up the assignment, however, do any necessary computer work and write the answers yourself. This policy exists for two reasons. First, we want your grade to represent your own work. Second, it is important to know how to write up the major features of an analysis and doing so on your own for homework is a good way to get more comfortable with this process. Violation of this policy will make you subject to disciplinary action (including dismissal) by the GSPH.
2. All students are expected to adhere to the school's standards of academic honesty. Any work submitted by a student for evaluation must represent his/her own intellectual contribution and efforts. The GSPH policy on academic integrity, approved by EPCC on 10/14/08, which is based on the University policy, is available online at [http://www.publichealth.pitt.edu/Portals/0/Main/Prospective%20Students/Academics/Pitt%20Public%20Health%20Academic%20Handbook-Part%20IV%20G\\_AcademicIntegrity\\_AY2014-15.pdf](http://www.publichealth.pitt.edu/Portals/0/Main/Prospective%20Students/Academics/Pitt%20Public%20Health%20Academic%20Handbook-Part%20IV%20G_AcademicIntegrity_AY2014-15.pdf)

These guidelines are based on the University policy found here:

<http://www.provost.pitt.edu/info/acguidelinespdf.pdf>

The policy includes obligations for faculty and students, procedures for adjudicating violations, and other critical information. Please take the time to read this policy. Students committing acts of academic dishonesty, including plagiarism, unauthorized collaboration on assignments, cheating on exams, misrepresentation of data, and facilitating dishonesty by others, will receive sanctions appropriate to the violation(s) committed. Sanctions include, but are not limited to, reduction of a grade for an assignment or a course, failure of a course, and dismissal from GSPH.

All student violations of academic integrity must be documented by the appropriate faculty member; this documentation will be kept in a confidential student file maintained by the GSPH Office of Student Affairs. If a sanction for a violation is agreed upon by the student and instructor, the record of this agreement will be expunged from the student file upon the student's graduation. If the case is referred to the GSPH Academic Integrity Hearing Board, a record will remain in the student's permanent file.

3. If you have a disability for which you are requesting an accommodation, please notify the instructor and [Disability Resources and Services](#) no later than the second

week of term. DRS will verify your disability and determine reasonable accommodations for this course.

4. Specific guidelines for the exams will be discussed in class, and will be written on all exams. In short: All exams are closed book; you will be permitted to bring in notes of prespecified length. No cell phone use (including the calculator function). Please use a regular (not cell phone) calculator if you wish. No computer use allowed. No texting or use of internet while taking exams. Exams are in our regular classroom at our regular time.
5. Homework will be due in class on the announced due date. Bring a hard copy (paper) of your homework to class and hand it in at the beginning of class. Make a copy of your homework if the due date is close to an exam date. Homework solutions will be posted after class and homework submitted after posting will not be accepted. If you cannot attend class on the day the homework is due, email your homework to the instructor prior to the start of class.
6. Please set cell phones to a silent mode during class. If you need to work on a non-class-related activity, please leave the lecture hall.
7. To ensure the open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use. If you would like to record class, please email the instructor to obtain permission.

## Course Requirements and Grading:

There will be 3 in-class exams and 6 homework assignments. The contribution of each of these assessments toward the final grade will be as follows:

1/4	Homework
1/4	Exam 1 on 10/x/18
1/4	Exam 2 on 11/x/18
1/4	Exam 3 on 12/12/18

The exams will be during the regular class time in the regular classroom.

Two problems will be chosen on each homework to be graded. We will not identify those problems prior to your handing in the homework. We will not grade all problems.

We encourage you to make a copy of your homework prior to handing it in if you will need it for an exam. We will do our best to return homeworks promptly but may not be able to return them prior to an exam.

One homework assignment will be dropped from your homework grade. In other words, your best 5 homeworks will contribute toward your homework grade. This gives you an opportunity not to turn in an assignment. We encourage you to do all assignments, even if you do not hand them all in.

Course grades will be assigned based on the following minimal scale. Note that this is a minimal scale and, in certain circumstances, grades can be curved up.

[93%, 100%]	A;	[90%, 93%),	A-;
[87%, 90%)	B+;	[83%, 87%)	B; [80, 83) B-;
[77%, 80%)	C+;	[73%, 77%)	C; [70, 73) C-;
[67%, 70%)	D+;	[63%, 67%)	D; [60, 63) D-;
< 60%	F		

You are responsible for the material presented in class, recitation, and the assigned textbook readings, and on homework assignments.

## Suggestions for Succeeding in the Class:

1. Review the lecture and recitation notes, read the text, and attend class. Although the lecture and recitation notes will be posted on Courseweb prior to class, there may be blank areas that are filled in during class.
2. Keep updated on the class on Courseweb.
3. Obtain Stata and practice using it. If you run into problems with Stata, give it your best try but do not get frustrated – ask for help via email, in office hours, or during class.

4. Read the textbook, especially if you are confused about a concept as it provides an alternative perspective to that presented in class.
5. You are required to do the homework problems. We will provide supplementary problems if you want extra practice. If you are unsure of a concept, please do the supplementary problems. Also we advise doing all homeworks, even if you do not turn them all in.
6. Ask questions. You will help others in the class if you speak up.
7. Ask for help in office hours and for individual help if you need it. Ask early. Monitor your grade on Courseweb and if you are concerned about your performance, discuss your situation with the instructor.

**Course Schedule:**

Note that the course may actually proceed faster or slower depending on the needs of the class.

<b>Approximate Number of Lectures</b>	<b>Topic(s) and Readings.</b> <b>(Chapter and section (§) numbers refer to the required textbook)</b>
2 lectures	Unit 1. Course Introduction. (Chapter 1)  Unit 2. Graphics and Descriptive Statistics (Chapters 2 & 3)  a) Measures of central tendency and variability b) Presentations of distributional shape c) Exploration of relationships d) Exploring Data Quality  Learning Objectives/Competencies: 1, 4, 5, 5a
2 lectures	Unit 3. Introduction to Probability (Chapter 4)  a) Independent outcomes and conditional probability b) Mutually exclusive outcomes c) Complementary outcomes d) Applications, including screening  Learning Objectives/Competencies: 2, 5, 6
2 lectures	Unit 4. Populations, sampling distributions, and the Normal distribution (Chapter 6)  Learning Objectives/Competencies: 2, 4
3 lectures	Unit 5. One-sample inference for normal populations.  a) Inference about the mean of a normal population (§ 7.2, 7.4, 8.1, 8.3)  Learning Objectives/Competencies: 3, 5, 5b, 6
<b>1 class period</b>	<b>Exam 1</b> <b>Covers Homeworks 1 and 2; Units 1, 2, 3, 4, 5a.</b>  Learning Objectives/Competencies Assessed: 1, 2, 3, 4, 5, 5a, 5b, 5d, 6

**Course Schedule (continued):**

<b>Approximate Number of lectures</b>	<b>Topic(s) and Readings. (Chapter and section (§) numbers refer to the required textbook.)</b>
3 lectures	Unit 5. One-sample inference for continuous outcomes. <ul style="list-style-type: none"> <li>b) Inference about the variance of a normal population (§ 7.3, 8.4)</li> <li>c) Assessing assumptions</li> <li>d) Study planning and sample size calculations (§ 7.5 – 7.6)</li> </ul> Learning Objectives/Competencies: 1, 3, 5, 5b, 6
3 lectures	Unit 6. Two-sample inference for continuous outcomes. <ul style="list-style-type: none"> <li>a) Inference about the means of two populations, paired samples (§ 9.3)</li> <li>b) Inference about the means of two populations, independent samples, equal variances (§ 9.2)</li> <li>c) Inference about the variances of two populations (§ 9.4)</li> <li>d) Inference about the means of two populations, unequal variances (§ 9.2)</li> <li>e) Study planning and sample size calculations</li> <li>f) Nonparametric tests (§ 13.1 – 13.4)</li> </ul> Learning Objectives/Competencies: 1, 3, 5, 5b, 6
2 lectures	Unit 7. Analysis of Variance <ul style="list-style-type: none"> <li>a) One way ANOVA (§ 12.1)</li> <li>b) Introduction to multi-way ANOVA (§ 12.2)</li> <li>c) Kruskal-Wallis (§ 13.5)</li> </ul> Learning Objectives/Competencies: 3, 5, 5b, 6
<b>1 class period</b>	<b>Exam 2</b> <b>Covers Homeworks 3 and 4; Units 5-7.</b>  Learning Objectives/Competencies Assessed: 1, 3, 5, 5b, 5d, 6

**Course Schedule (continued):**

<b>Approximate Dates</b>	<b>Topic(s) and Readings. (Chapter and section (§) numbers refer to the textbook.)</b>
5 lectures	Unit 9. Analysis of binomial data  a) Binomial random variables (§ 5.1-5.2) b) Inference about a binomial proportion (§ 7.1, 8.2) c) Inference about two or more binomial proportions (§ 9.1) d) Two-way contingency tables in general (§ 11.1-11.2) e) Study planning and sample size calculations  Learning Objectives/Competencies: 1, 3, 5, 5b, 6
5 lectures	Unit 11. Regression and Correlation (Chapter 10)  a) Correlation definition b) Simple linear regression c) Multiple regression d) Partial, multiple and rank correlation e) Introduction to logistic regression and simple survival analysis (Chapter 14)  Learning Objectives and Competencies: 1, 3, 5, 5b, 5c, 6
<b>1 class period</b>	<b>Exam 3</b> <b>Covers Homeworks 5 and 6; Units 8-11.</b>  Learning Objectives/Competencies Assessed: 1, 3, 5b, 5c, 5d, 6

**Educational Policies and Curriculum Committee**  
**Graduate School of Public Health**  
**University of Pittsburgh**  
**(Revised: 9/22/2015)**

**REQUEST FOR APPROVAL OF NEW COURSES AND COURSE CHANGES**

1. **General Instructions:**

- a. Faculty should submit this form and the associated syllabus following the Pitt Public Health Syllabus Guidelines and the Syllabus Checklist (on pages 4 and 5) **by e-mail** to Patricia Documet, Chair ([pdocumet@pitt.edu](mailto:pdocumet@pitt.edu)) and Robin Leaf, EPCC Staff Liaison ([ral9@pitt.edu](mailto:ral9@pitt.edu)). If you choose not to include all the information detailed on the Syllabus Guidelines in your course syllabus for distribution to students, please attach this information to the proposal.
- b. The initiating Department is asked to submit one hard copy of this completed form with the proper signatures, syllabus and other materials (if any) to Robin Leaf in Student Affairs **at least one week prior** to the EPCC meeting. If this target date is not met, the proposal will be deferred for consideration at the next meeting scheduled.
- c. You will be contacted by the EPCC Chair or the EPCC Staff Liaison to schedule a presentation and discussion of your program/course proposal with the Committee, if possible at the next scheduled EPCC meeting.

2. **Review based on the following (check all which apply):**

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> New course, not previously approved | <input type="checkbox"/> Course modification (major)            |
| <input type="checkbox"/> Course title change                            | <input type="checkbox"/> Special topics course content          |
| <input type="checkbox"/> Cross-listing only                             | <input type="checkbox"/> Pitt Public Health Core Course         |
| (Specify academic unit & course number): _____                          | <input type="checkbox"/> Practicum, internship, field placement |

3. **Course designation:**

Course Number BIOST 2050 Title Longitudinal and Clustered Data analysis Credits 2

4. **Cross-listing:**

If you want to cross-list this course in any other Pitt Public Health department or any other school of the University, specify which department(s) and School(s) and provide brief justification.

*NO*

5. **Course Instructors:**

(Indicate type of Pitt Public Health faculty appointment,\* and percentage of total course time/effort anticipated. For any instructor who does not hold a Pitt Public Health faculty appointment, indicate her/his title and affiliation.)

- a. Principal instructor:  
*(Joyce) Chung-Chou H. Chang, PhD*

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\* The principal instructor for any Pitt Public Health course must have a primary, secondary or adjunct appointment in the school.

Departments of Medicine, and Biostatistics  
200 Meyran Ave., Suite 200  
412-692-4868  
changj@pitt.edu

&

Abdus S. Wahed, PhD  
Department of Biostatistics  
Graduate School of Public Health  
University of Pittsburgh  
412-624-3053  
wahed@pitt.edu

b. Co-instructors (if any):

6. **Statement of the course for Course Inventory.** Include purpose of course; summary of prerequisites, if any; general course content; and method of conducting course (e.g., lecture, laboratory, field work, etc.).

*This introductory course in statistical modeling is intended for Masters' students in biostatistics and Ph.D. students in epidemiology or biostatistics in their second year of graduate work. This course may be thought of the third methods course in Biostatistics following BIOST 2041, BIOST 2048, and BIOST 2049. The course focuses on regression methods for the analysis of longitudinal or more generally clustered data with emphasis on generalized estimating equation. The course objectives are to introduce generalized estimating equations (GEEs), mixed models, and generalized linear mixed models from an applied perspective to analyze longitudinal and clustered data, to understand the justification and applicability of standard procedures to standard problems, including model interpretation and assessment of model adequacy.*

7. **Student enrollment criteria/restrictions:**

- a. Indicate any maximum or minimum number of students and provide justification for this limitation.  
*Thirty students maximum. The course has applied software package-based data analysis homework and project presentations which are difficult to schedule and evaluate for a class larger than this size.*
- b. If admission is by permission of instructor, state criteria to be applied.  
*If official record does not indicate that the pre-requisites are met (e.g., equivalent coursework done at some other institutions), permission from instructor is needed.*
- c. Provide a brief description of any prerequisite skills or knowledge areas that are necessary for students entering this course, including any specific course prerequisites or equivalents.  
*BIOST 2049*

8. **Course schedule and allocation of hours:**

- a. Number of course hours per session 30 Sessions per week 2 Weeks per academic term 15
- b. Approximate allocation of class time (hours or %) among instructional activities:  
Lectures 100%\* Seminars \_\_\_\_\_ Recitations \_\_\_\_\_ Field work \_\_\_\_\_ Laboratory \_\_\_\_\_  
Other (specify): \*Except for three lectures that are used for mid-term exams and presentations \_\_\_\_\_
- c. Term(s) course will be offered: Fall X Spring \_\_\_\_\_ Summer Term \_\_\_\_\_ Summer Session \_\_\_\_\_

9. **Grading of student performance:**

Indicate the grading system to be used (A, B, C, etc.; H, S, U); provide statement justifying use of system other than letter grade.

Letter Grades(A, B, C, ..)

10. **On-line course delivery:**

Indicate the extent to which you will be using on-line instructional methods in teaching this course by checking all of the options below which apply:

I plan to use the course management aspects of CourseWeb/ Blackboard (or equivalent), e.g., grade book, announcements.

I plan to use the interactive features of CourseWeb/Blackboard (or equivalent), e.g., discussion board, etc.

I have designed the course for remote (off-site) learning with little/no classroom attendance required.

I do not plan to use on-line instruction methods for this course (briefly explain)

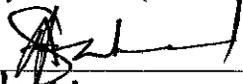
11. **Relevance of course to academic programs and curricula:**

- a. Describe how this course contributes to learning objectives specified for the curriculum of one or more Pitt Public Health degree or certificate programs. Indicate whether course is required for any specified degree or certificate.

*This will be a required course for MS and PhD programs in Biostatistics serving as the second applied regression sequence and the third methods course in biostatistics following BIOST 2011/2041/2048 and 2049. With the advancement of regression methods in biostatistics, this course will fulfill the need for learning regression methods for clustered and longitudinal data analysis.*

- b. Describe how this course addresses public health issues involving diversity (gender, race, ethnicity, culture, disability, or family status).
- *When possible the class will include questions for discussions, assignments or exams, and case studies, that will involve socio-cultural contexts reflecting human diversity.*
  - *Data analysis examples will investigate disparities across racial and gender groups.*
  - *The class will have set ground-rules for respectful interaction in the classroom, specifically for responding respectfully to the ideas and questions of others. Conduct silencing or denigrating others (intentionally or not) will be properly dealt with appropriately.*

12. **Signature and date of principal faculty member (include department/program) making request:**

Name/Title: Abdus S. Wahed 

Date: 5/24/18

*Prof. of Biostatistics*

13. **Signature and date of endorsement of department chairperson:**

Name/Title: 

Date: 5/24/18

*Professor and Chair, Biostatistics*

14. (For cross-listing only)

**Signature and date of endorsement of department chairperson:**

Name/Title: \_\_\_\_\_

Date: \_\_\_\_\_

**Educational Policies and Curriculum Committee  
Graduate School of Public Health  
University of Pittsburgh  
(11/19/2013)**

**SYLLABUS CHECKLIST FOR NEW AND REVISED COURSES**

Addendum to **REQUEST FOR APPROVAL OF NEW COURSES AND COURSE CHANGES FORM**

*Objective to assist faculty to ensure syllabus contains the required and necessary elements  
to provide students with clear expectations of the course.*

NOTE: \* indicates a required element of the syllabus. If N/A is checked or this element is not included  
complete the information detailed on page two for all instances.

<b>Syllabus Area</b>	<b>Recommended Detail * Required</b>	<b>Included in Your Syllabus?</b>					
<i>Heading</i>	Course Number*	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Course Title*	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Course Meeting Time/Day of Week*	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Classroom Location*	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
<i>Faculty Information</i>	Office Location*	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Office Hours*	Yes	<input type="checkbox"/> TBA	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Phone Number*	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Email Address*	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Teaching Philosophy	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Teaching Assistant Contact	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
<i>Student Expectations in Classroom</i>	Behavior/ Ground Rules (cell phones off, laptops off, etc.)	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Recording of Lectures	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
<i>Course Summary</i>	Course Description*	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Learning Objectives*	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
<i>Materials</i>	Required Textbooks/ Articles/Readings	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Required Software	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Required Equipment (including use of CourseWeb/Blackboard)	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Recommended Material	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>
	Availability of Software for Purchase and/or Use	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	N/A	<input type="checkbox"/>





**Credit hours:** 2 credits

**Class meeting times:** 10am-11:50am Wednesdays and Fridays

Note: This class starts on Wednesday, August 29, 2018 and ends on Friday, October 19, 2018.  
Midterm exam will be on Friday, September 21.  
Final exam will be on Friday, October 19.

**Class location:** G23 Parran Hall, GSPH

**Instructors:**

(Joyce) Chung-Chou H. Chang, PhD  
Departments of Medicine and Biostatistics  
200 Meyran Ave., Suite 200  
412-692-4868  
[changj@pitt.edu](mailto:changj@pitt.edu)

Abdus S. Wahed, PHD  
Department of Biostatistics  
Graduate School of Public Health  
University of Pittsburgh  
412-624-3053  
[wahed@pitt.edu](mailto:wahed@pitt.edu)

**Office hours:** TBA

**Teaching Assistant:** TBA

**TA Office hours:** TBA

**Prerequisites:** BIOST 2042 (Intro to Stat Methods II) or equivalent courses, and  
BIOST 2049 (Applied Regression Analysis) or equivalent courses

**Tentative schedule:**

Introduction to correlated data, traditional methods for analyzing correlated data, marginal model vs. conditional model

General and generalized mixed models: general concepts, continuous response, binary response, and counts

Marginal model and generalized estimating equations (GEEs): general concepts, continuous response, binary response, and counts

Methods for handling missing data

## Course Description

This introductory course in statistical modeling is intended for Masters' students in biostatistics and PhD/MD students major in health science (non-statistics), or PhD in biostatistics in their second year of graduate work. This course may be thought of the 4<sup>th</sup> introductory course in Biostatistics following BIOST 2041, BIOST 2042, and BIOST 2049. The course focuses on regression methods for the analysis of correlated data including longitudinally measured and multilevel clustered data.

The course objectives are to:

- Understand the unique features of correlated data and understand the basic principles of correlated data analysis
- Demonstrate longitudinal data graphically and tabularly in order to grasp the general patterns
- Introduce generalized estimating equations (GEEs), mixed models, and generalized linear mixed models from an applied perspective to analyze longitudinal and clustered data.
- Identify appropriate model(s) for estimating covariate effects on correlated outcomes by accounting for correlation among observations with a cluster
- Perform correlated data analysis using a statistical package with associated inference/prediction calculation and assessment of model adequacy
- Develop oral and written communication skills through the description of analytic strategies and the summarization, interpretation, and presentation of analysis results
- Develop analytic skills through the analysis of data sets taken from the fields of medicine and public health.

## Required Materials

### Textbook

Hedeker D, Gibbons RD (2006). *Longitudinal Data Analysis*. Hoboken, NJ: Wiley.

**Book: Available, R853.S7 H48 2006, Falk Library - 200 Scaife Hall**

### Software

Other Stata 15 reference manuals: Graphics; User's Guide; Longitudinal Data/Panel Data; Survival Analysis and Epidemiological Tables.

Notes:

- The entire set of Stata manuals is on-line for Stata 15.
- Currently, Stata 15 is available in all campus computing labs and the GSPH lab.
- Stata 15 is available for students as a no-cost download at My Pitt and can be obtained for a Mac or PC. A CD is also available for \$5 for purchase. Details please check <http://technology.pitt.edu/software/stata-for-students>.

Resources for learning Stata on the Stat web site [www.stata.com](http://www.stata.com), particularly Stata starter kit materials on UCLA Stata web site [www.ats.ucla.edu/stat/stata/sk](http://www.ats.ucla.edu/stat/stata/sk).

## Optional Materials

### Recommended textbooks

Liu X (2016). *Methods and Applications of Longitudinal Data Analysis*. Waltham, MA: Academic Press.  
Rabe-Hesketh S, Skrondal A (2008). *Multilevel and Longitudinal Modeling Using Stata, 2<sup>nd</sup> Edition*. College Station, TX: Stata Press.

Twisk JWR (2013). *Applied Longitudinal Data Analysis for Epidemiology: A Practical Guide, 2<sup>nd</sup> Edition*. New York: Cambridge University Press.

Fitzmaurice GM, Laird NM, Ware JH (2011). *Applied Longitudinal Analysis, 2<sup>nd</sup> Edition*. Hoboken, NJ: Wiley.

### Recommended textbooks using statistical packages

Vonesh EF (2012). *Generalized Linear and Nonlinear Models for Correlated Data: Theory and Applications Using SAS*. Cary, NC: SAS Institute.

Rabe-Hesketh S, Skrondal A (2012). *Multilevel and Longitudinal Modeling Using Stata: Volume I, 3<sup>rd</sup> Edition*. College Station, TX: Stata Press.

Rabe-Hesketh S, Skrondal A (2012). *Multilevel and Longitudinal Modeling Using Stata: Volume II, 3<sup>rd</sup> Edition*. College Station, TX: Stata Press.

## Course requirements

- Homework: Homework is an integral part of the course and will be assigned approximately weekly. **No late homework assignments will be accepted.** The homework will involve using Stata, SAS and possibly other statistical programming languages on the microcomputers.

Important note: Students are encouraged to discuss course content (lecture notes, reading assignments, and computational issues) with each other. However, **each student is expected to run his/her own analysis and summarize his/her own work in each homework assignment turned in.**

- Open-book and open-notes, in-class examinations:  
Early term exam: Friday, September 21, 2018  
Late term exam: Friday, October 19, 2018

## Grading

The course grade will be based on a weighted average of the homework and examinations, with the following weights:

60%	homework
20%	early term exam
20%	late term exam

Note: In calculating final grades, we will take into account the degree of difficulty of exams and the average performance of students.

## Course Policies

### Students with Disabilities

Students with disabilities for which they are requesting an accommodation should contact both the course instructor and the Disability Resources Services, 216 William Pitt Union (412-648-7890 or TTY 412-383-7355) as early as possible.

### GSPH Academic Integrity Policy

All students are expected to adhere to the school's standards of academic honesty. Any work submitted by a student for evaluation must represent his/her own intellectual contribution and efforts. The GSPH policy on academic integrity, which is based on the University policy, is available online at <http://www.publichealth.pitt.edu/interior.php?pageID=126>. The policy includes obligations for faculty and students, procedures for adjudicating violations, and other critical information. Please take the time to read this policy.

Students committing acts of academic dishonesty, including plagiarism, unauthorized collaboration on assignments, cheating on exams, misrepresentation of data, and facilitating dishonesty by others, will receive sanctions appropriate to the violation(s) committed. Sanctions include, but are not limited to, reduction of a grade for an assignment or a course, failure of a course, and dismissal from GSPH.

All student violations of academic integrity must be documented by the appropriate faculty member; this documentation will be kept in a confidential student file maintained by the GSPH Office of Student Affairs. If a sanction for a violation is agreed upon by the student and instructor, the record of this agreement will be expunged from the student file upon the student's graduation. If the case is referred to the GSPH Academic Integrity Hearing Board, a record will remain in the student's permanent file. Repeat violations automatically will be referred to the Hearing Board.

Note: All students are required to complete the GSPH on-line instruction in Academic Integrity. Completion of these modules by all current faculty and all current and new students will be mandatory effective for the Fall Term 2010. The policy regulating the faculty completion of the module was approved by GSPH Council earlier in the summer.

Please review the information, including the official policy, instructions on how to access the online faculty academic integrity module, and where to submit your certificate of completion at [www.publichealth.pitt.edu/academicintegrity](http://www.publichealth.pitt.edu/academicintegrity).

### Copyright

Course materials may be protected by copyright. United States copyright law, 17 USC section 101, et seq., in addition to University policy and procedures, prohibit unauthorized duplication or retransmission of course materials. See Library of Congress Copyright Office and the University Copyright Policy.

## Competencies addressed in this course

This course focuses on the Data Analysis competency domain. Every session covers elements of the Applied Analytic Techniques competency, with the following learning objective: "Determine and apply a range of appropriate statistical techniques to answer research questions and explain the implications of missing data on conclusions drawn from statistical results."

## Course Schedule

Date	Lecture	Notes
Wednesday, August 29	Lecture 1: Correlated response data and traditional methods of longitudinal data analysis (ANOVA, MANOVA)	HW 1 assigned
Friday, August 31	Lecture 2: Linear mixed effects models I	
Wednesday, September 5	Lecture 3: Linear mixed effects models II	
Friday, September 7	Lecture 4: Covariance Pattern Models and mixed models with autocorrelated errors	HW 1 due HW 2 assigned
Wednesday, September 12	Lecture 5: Inference (ML and REML) and patterns of residual covariance structure	
Friday, September 14	Lecture 6: Residual and influence diagnostics	
Wednesday, September 19	Lecture 7: Generalized linear models (GLMs) with generalized estimating equations (GEEs) I	HW 2 due HW 3 assigned
Friday, September 21	Early term exam (covers Lectures 1-6)	
Wednesday, September 26	Lecture 8: GLM with GEEs II	
Friday, September 28	Lecture 9: Generalized linear mixed models (binary data)	HW 3 due HW 4 assigned
Wednesday, October 3	Lecture 10: Generalized linear mixed models (ordinal or nominal data)	
Friday, October 5	Lecture 11: Generalized linear mixed models (count data)	
Wednesday, October 10	Lecture 12: Latent growth, latent growth mixture, and group-based models	HW4 due HW 5 assigned
Friday, October 12	Lecture 13: Mixed models for multilevel data	
Wednesday, October 17	Lecture 14: Methods for handling missing data	HW 5 due
Friday, October 19	Late exam (focus on lecture 7-14)	

**Educational Policies and Curriculum Committee**  
**Graduate School of Public Health**  
**University of Pittsburgh**  
**(Revised: 9/22/2015)**

**REQUEST FOR APPROVAL OF NEW COURSES AND COURSE CHANGES**

**1. General Instructions:**

- a. Faculty should submit this form and the associated syllabus following the Pitt Public Health Syllabus Guidelines and the Syllabus Checklist (on pages 4 and 5) **by e-mail** to Patricia Documet, Chair ([pdocumet@pitt.edu](mailto:pdocumet@pitt.edu)) and Robin Leaf, EPCC Staff Liaison ([ral9@pitt.edu](mailto:ral9@pitt.edu)). If you choose not to include all the information detailed on the Syllabus Guidelines in your course syllabus for distribution to students, please attach this information to the proposal.
- b. The initiating Department is asked to submit one hard copy of this completed form with the proper signatures, syllabus and other materials (if any) to Robin Leaf in Student Affairs **at least one week prior** to the EPCC meeting. If this target date is not met, the proposal will be deferred for consideration at the next meeting scheduled.
- c. You will be contacted by the EPCC Chair or the EPCC Staff Liaison to schedule a presentation and discussion of your program/course proposal with the Committee, if possible at the next scheduled EPCC meeting.

**2. Review based on the following (check all which apply):**

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> New course, not previously approved | <input type="checkbox"/> Course modification (major)            |
| <input type="checkbox"/> Course title change                            | <input type="checkbox"/> Special topics course content          |
| <input type="checkbox"/> Cross-listing only                             | <input type="checkbox"/> Pitt Public Health Core Course         |
| (Specify academic unit & course number): _____                          | <input type="checkbox"/> Practicum, internship, field placement |

**3. Course designation:**

Course Number BCHS 2992  
Title Systems Theories and Approaches  
Credits 1

**4. Cross-listing:**

If you want to cross-list this course in any other Pitt Public Health department or any other school of the University, specify which department(s) and School(s) and provide brief justification.

**5. Course Instructors:**

(Indicate type of Pitt Public Health faculty appointment,\* and percentage of total course time/effort anticipated. For any instructor who does not hold a Pitt Public Health faculty appointment, indicate her/his title and affiliation.)

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\* The principal instructor for any Pitt Public Health course must have a primary, secondary or adjunct appointment in the school.

- a. Principal instructor: Christina Mair (Assistant Professor, BCHS), **50%**
- b. Co-instructors (if any): Jessica Burke (Associate Professor, BCHS), **50%**

6. **Statement of the course for *Course Inventory*.** Include purpose of course; summary of prerequisites, if any; general course content; and method of conducting course (e.g., lecture, laboratory, field work, etc.).

Systems science approaches were developed to understand connections between a system's structure and its behavior over time. The use of such approaches within public health research and practice has grown tremendously over the past decade. Identifying and understanding the dynamic relationships between individuals and their social and physical environments can help us identify potential leverage points for intervention. This course provides an introduction to systems thinking and models in public health, explores the importance of associated theories and underscores the utility of systems science approaches within public health research and practice. We will highlight current systems science public health research and encourage students to think critically about the utility of systems theories and approaches within public health.

Method: Lecture, discussion and in-class exercises

7. **Student enrollment criteria/restrictions:**

- a. Indicate any maximum or minimum number of students and provide justification for this limitation.

25 maximum because of the discussion based nature of the course.

- b. If admission is by permission of instructor, state criteria to be applied.

NA

- c. Provide a brief description of any prerequisite skills or knowledge areas that are necessary for students entering this course, including any specific course prerequisites or equivalents.

A basic understanding of health behavior theory is required for this course.

8. **Course schedule and allocation of hours:**

- a. Number of course hours per session 3 Sessions per week 1 Weeks per academic term 5

- b. Approximate allocation of class time (hours or %) among instructional activities:

Lectures 2 Seminars \_\_\_\_\_ Recitations \_\_\_\_\_ Field work \_\_\_\_\_ Laboratory \_\_\_\_\_  
 Other (specify): 1 discussion and class activities/exercises

- c. Term(s) course will be offered: Fall x Spring x Summer Term \_\_\_\_\_ Summer Session \_\_\_\_\_

9. **Grading of student performance:**

Indicate the grading system to be used (A, B, C, etc.; H, S, U); provide statement justifying use of system other than letter grade.

Letter grades will be used.

10. **On-line course delivery:**

Indicate the extent to which you will be using on-line instructional methods in teaching this course by checking all of the options below which apply:

I plan to use the course management aspects of CourseWeb/ Blackboard (or equivalent), e.g., grade book, announcements.

I plan to use the interactive features of CourseWeb/Blackboard (or equivalent), e.g., discussion board, etc.

I have designed the course for remote (off-site) learning with little/no classroom attendance required.

I do not plan to use on-line instruction methods for this course (briefly explain)

11. **Relevance of course to academic programs and curricula:**

- a. Describe how this course contributes to learning objectives specified for the curriculum of one or more Pitt Public Health degree or certificate programs. Indicate whether course is required for any specified degree or certificate.

This course will provided students with an introduction to system science thinking, theories and methods. It is a new requirement for MPH students in BCHS and is in response to the new CEPH competencies.

- b. Describe how this course addresses public health issues involving diversity (gender, race, ethnicity, culture, disability, or family status).

Many of the public health issues addressed using a systems science approach are associated with complex issues involving diversity (e.g. socioeconomic factors and racial disparities). We will discuss these issues during the course.

12. **Signature and date of principal faculty member (include department/program) making request:**

Name/Title: Wesley Mc

Date: 5/23/18

13. **Signature and date of endorsement of department chairperson:**

Name/Title: Stan M. Albert

Date: 5/23/18

14. (For cross-listing only)

**Signature and date of endorsement of department chairperson:**

Name/Title: \_\_\_\_\_

Date: \_\_\_\_\_



**Educational Policies and Curriculum Committee  
Graduate School of Public Health  
University of Pittsburgh  
(11/19/2013)**

**SYLLABUS CHECKLIST FOR NEW AND REVISED COURSES**

**Addendum to REQUEST FOR APPROVAL OF NEW COURSES AND COURSE CHANGES FORM**

*Objective to assist faculty to ensure syllabus contains the required and necessary elements to provide students with clear expectations of the course.*

NOTE: \* indicates a required element of the syllabus. If N/A is checked or this element is not included, complete the information detailed on page two for all instances.

Syllabus Area	Recommended Detail * Required	Included in Your Syllabus?			
Heading		Yes	No	N/A	
	Course Number*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Course Title*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Course Meeting Time/Day of Week*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Classroom Location*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Faculty Information</b>	Office Location*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Office Hours*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Phone Number*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Email Address*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Teaching Philosophy	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Teaching Assistant Contact	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Student Expectations in Classroom</b>	Behavior/ Ground Rules (cell phones off, laptops off, etc.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Recording of Lectures	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Course Summary</b>	Course Description*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Learning Objectives*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Materials</b>	Required Textbooks/ Articles/Readings	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Required Software	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Required Equipment (including use of CourseWeb/Blackboard)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Recommended Material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Availability of Software for Purchase and/or Use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>



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**COURSE NUMBER: BCHS 2992**  
**Systems Theories and Approaches**

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**Dates:**

October 4 through November 1 2018 (5 weeks)

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**Meeting days, time:**

Thursdays, 2:00-4:50PM

**Location:** A215 Crabtree

**Course Co-Instructors:**

**Christina Mair, PhD**

Assistant Professor, Behavioral and Community Health Sciences  
Co-Director, Center for Social Dynamics and Community Health  
Graduate School of Public Health, Room 6136  
412-624-3613  
[cmair@pitt.edu](mailto:cmair@pitt.edu)

**Jessica Burke, PhD**

Associate Professor, Behavioral and Community Health Sciences  
Co-Director, Center for Social Dynamics and Community Health  
Graduate School of Public Health, Room 6132  
412-624-3610  
[jgburke@pitt.edu](mailto:jgburke@pitt.edu)

**Office Hours:** By appointment.

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**Course Description**

Systems science approaches were developed to understand connections between a system's structure and its behavior over time. The use of such approaches within public health research and practice has grown tremendously over the past decade. Identifying and understanding the dynamic relationships between individuals and their social and physical environments can help us identify potential leverage points for intervention. This course provides an introduction to systems thinking and models in public health, explores the importance of associated theories and underscores the utility of systems science approaches within public health research and practice. We will highlight current systems science public health research and encourage students to think critically about the utility of systems theories and approaches within public health.

## Learning Objectives

Upon successfully completing this course, students will be able to:

- Explain the history of and current and future applications of systems science in public health research and practice.
- Describe the key theories and research methods associated with a systems science approach in public health.
- Evaluate peer-reviewed literature that incorporates systems science approaches in public health.
- Develop a mechanism-based causal framework that applies a systems science approach and integrates relevant theory.

## Required Texts

All required readings (articles) and information classroom activities will be posted on CourseWeb (Blackboard), which can be accessed through MyPitt.edu. Check regularly as information will be updated throughout the semester.

## Class Expectations

This course is a hands-on mixture of lectures, discussions, and in-class activities. Preparation for, and attendance in, every class is essential for success in the class. Some expectations we have for students include:

- **Regular Attendance and Participation** – Class attendance and participation is critical to the success of each student. Lectures will not be recorded. All students are expected to attend each class unless otherwise discussed in advance with the instructor. Students should be ready to contribute during class activities and discussions.
- **Complete Assigned Readings** – All required readings should be read before class and students should be prepared to discuss the readings.
- **Complete Assignments** – All assignments should be completed before the start of class. If a student requires an extension, the student should contact the instructor at least 48 hours before the assigned due date.
- **Cell Phones** – Students should ensure all cell phones are on mute or vibrate during class. If a student needs to take a phone call, they should leave the classroom to do so.
- **Laptops** – Students should use laptops during class for the purposes of this specific class only (i.e. taking notes, participation in in-class exercises). During class, students should refrain from surfing the internet, checking email and working on outside assignments.

## Course Assignments

Three Homework Assignments: Students will select a public health problem (Week 1). For homework assignment #1, they will find one empirical article published in a peer-reviewed journal on this topic and submit the article and a brief discussion of whether or not it uses a systems thinking approach (Week 2). For homework assignment #2, they will begin to develop a causal model of the complex relationships for

a peer critique in Week 3. For Week 4, they will turn in a homework assignment #3 that describes how a systems theory can be applied to the topic.

**Final Project:** Develop a causal model of a system that illustrates the social complexity associated with the health outcome. The final causal model will be submitted upon arrival to the final day of class (Week 5).

### Student Performance Evaluation

- Homework assignments 30%
- Final paper 30%
- Class attendance and participation 40% (students will be evaluated based on attendance and adherence to class expectations as described above)

### Grading Scale

90-100% A  
80-89% B  
70-79% C  
< 60% F

Please note: The instructor reserves the right to assign + and – grades.

### Accommodation for Students with Disabilities

If you have any disability for which you may require accommodation, you are encouraged to notify both your instructor and the Office of Disability Resources and Services, 140 William Pitt Union (Voice or TTD 412-648-7890) as early as possible in the term.

### Pitt Public Health Academic Integrity Statement

All students are expected to adhere to the school's standards of academic honesty. Any work submitted by a student for evaluation must represent his/her own intellectual contribution and efforts. The Graduate School of Public Health's policy on academic integrity, approved by EPCC on 10/14/08, which is based on the University policy, is available online in the Pitt Public Health Academic Handbook ([mypublichealth.pitt.edu](http://mypublichealth.pitt.edu)) > Students > Academics and Student Services > Academic Handbook. The policy includes obligations for faculty and students, procedures for adjudicating violations, and other critical information. Please take the time to read this policy.

Students committing acts of academic dishonesty, including plagiarism, unauthorized collaboration on assignments, cheating on exams, misrepresentation of data, and facilitating dishonesty by others, will receive sanctions appropriate to the violation(s) committed. Sanctions include, but are not limited to, reduction of a grade for an assignment or a course, failure of a course, and dismissal from the school.

All student violations of academic integrity must be documented by the appropriate faculty member; this documentation will be kept in a confidential student file maintained by the Office of Student Affairs.

If a sanction for a violation is agreed upon by the student and instructor, the record of this agreement will be expunged from the student file upon the student's graduation. If the case is referred to the Pitt Public Health Academic Integrity Hearing Board, a record will remain in the student's permanent file.

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**Copyright Notice**

Course material may be protected by copyright. United States copyright law, 14 USC section 101, et sec., in addition to University policy and procedures, prohibit unauthorized duplication or retransmission of course materials. See [Library of Congress Copyright Office](#) and the [University Copyright Policy](#).

Week	Date	Topics	Required Readings	Due (by start of class)
Week 1	TBD	<p><b>Introduction to systems thinking (what is systems thinking?)</b></p> <ul style="list-style-type: none"> <li>Explain the rationale for adopting a systems approach in Public Health</li> <li>Describe the difference between a multilevel and a systems approach.</li> </ul>	<ul style="list-style-type: none"> <li>Mabry and Kaplan (2013) <i>Systems Science: A Good Investment for the Public's Health</i>, Health Educ Behav 40: 9s-12s.</li> <li>Palma A and Lounsbury. (2017). Complexity: The evolution toward 21<sup>st</sup> century science in El-Sayed AM and Galea (Eds) <i>Science Systems and Population Health</i>. Oxford University Press</li> <li>Finegood DT, Johnston LM, Steinberg M, Matteson CL, Deck PB. (2014) Complexity, systems thinking and behavior change in Kahan S, Gielen AC, Fagan PJ, Green LW <i>Health Behavior Change in Populations</i>. Johns Hopkins University Press</li> </ul>	
Week 2	TBD	<p><b>Mechanism-based approaches (why systems theories?)</b></p> <ul style="list-style-type: none"> <li>Moving from statistical to mechanism-based explanations of public health phenomena.</li> <li>Linking systems theory and empirical research.</li> </ul> <p><b>Systems theories (what are key systems theories?)</b></p> <ul style="list-style-type: none"> <li>Theories linking micro and macro scales.</li> <li>General systems theories</li> <li>Middle level social theory</li> </ul>	<ul style="list-style-type: none"> <li>Peters DH. (2014). The application of systems thinking in health: why use systems thinking? <i>Health Research Policy and Systems</i> 12: 1-6.</li> <li>Additional readings TBD</li> </ul>	HW #1: Article identification and critique
Week 3	TBD		<ul style="list-style-type: none"> <li>Strogatz SH (1994). <i>Nonlinear Dynamics and Chaos</i>. New York: Perseus Books Publishing (chapter to be selected).</li> <li>Von Bertalanffy L. (1976). <i>General</i></li> </ul>	HW#2: Draft causal model

Week 4	<ul style="list-style-type: none"> <li>TBD</li> </ul>	<p><b>Applications of systems theories in public health research and practice (how are systems theories used?)</b></p> <ul style="list-style-type: none"> <li>Discuss examples of systems thinking in intervention development and implementation</li> <li>Identify intervention leverage points within a complex public health system</li> <li>Critique examples in published public health literature</li> </ul>	<p>system theory: Foundations, development and applications. New York: George Braziller. (chapter to be selected)</p> <ul style="list-style-type: none"> <li>Meadows D. (1999). Leverage points: Places to intervene in a system. Sustainability Institute.</li> <li>Additional TBD readings</li> </ul>	<ul style="list-style-type: none"> <li>HW# 3: Description of relevant theories</li> </ul>	
Week 5	<ul style="list-style-type: none"> <li>TBD</li> </ul>	<p><b>Methods and tools to study social mechanisms (what methods are available to better understand complex systems?)</b></p> <ul style="list-style-type: none"> <li>Simulation models (moving from causal loop diagrams to dynamic systems models)</li> <li>Agent-based models</li> <li>Social network analysis</li> <li>Other systems science methods</li> </ul>	<ul style="list-style-type: none"> <li>Auchincloss AH, Diez Roux AV. (2009) A new tool for epidemiology: The usefulness of dynamic-agent based models in understanding place effects on health. <i>Am J Epidemiology</i>, 168: 1-8.</li> <li>Luke DA and Stamatakis KA (2012). <i>Systems Science Methods in Public Health: Dynamics, Networks and Agents</i>. <i>Annu Rev Public Health</i>, 33: 357-376.</li> <li>Burke JG, Lich KH, Neal JW, Meissner HI, Yonas M, Mabry PL. (2015) Enhancing dissemination and implementation research using systems science methods. <i>Int J Behav Med</i>. 2015 Jun;22(3):283-91.</li> </ul>	<ul style="list-style-type: none"> <li>Final Project</li> </ul>	

## **Suggested Diversity Statements for Syllabi at Pitt Public Health**

**Option 1:** The University of Pittsburgh Graduate School of Public Health supports learning environments that are inclusive and respectful of all individuals. Every member of our community is expected to be respectful of the individual perspectives, experiences, behaviors, worldviews, and backgrounds of others.

**Option 2:** In this course, students, faculty and guests represent a diversity of individual perspectives, backgrounds, and experiences, which enriches our classes. We urge all to be respectful of others. While intellectual disagreement may be constructive, no harsh statements, or demeaning or discriminatory behavior will be permitted. If you feel uncomfortable, please feel free to approach me to discuss the situation.

**Option 3:** This course covers multi-dimensional academic topics. You are expected to share your views and be respectful of others' opinions. This will ensure a learning environment that values diverse experiences and expertise, which will facilitate Pitt Public Health's collaborative approach to solving problems.

Including a diversity (or inclusivity) statement on your syllabus can set the tone for your classroom environment. It shows students that you value and respect difference in intellectual exchange, and are aware of current campus conversations surrounding diversity. (*Adapted from Cornell's Center for Teaching Excellence resource, POD Network Conference, 2011.*)

#### **Sample Teaching Philosophy Statement**

I bring a set of experiences and knowledge into the classroom, as does each and every student. You know things I do not know, and one of the pleasures of teaching is sharing in the knowledge and experiences that you bring to class. I believe in sharing the process of learning equally, so class participation will be a key factor in my success and yours. I value each of your contributions, and hope that you will always feel comfortable offering opinions, asking questions, and helping everyone around you get the most out of the course.

#### **Sample Diversity Statement (American Society for Engineering Education)**

I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

#### **Sample Diversity Statement (California State University, Chico)**

Students in this class are encouraged to speak up and participate during class meetings. Because the class will represent a diversity of individual beliefs, backgrounds, and experiences, every member of this class must show respect for every other member of this class.

#### **Sample Safe Zone Statement (California State University, Chico)**

I am part of the Safe Zone Ally community network of trained Chico State faculty/staff/students who are available to listen and support you in a safe and confidential manner. As a Safe Zone Ally, I can help you connect with resources on campus to address problems you may face that interfere with your academic and social success on campus as it relates to issues surrounding sexual orientation/gender identity. My goal is to help you be successful and to maintain a safe and equitable campus.

### **LGBTQ Equality Statement (California State University, Chico)**

I am firmly committed to diversity and equality in all areas of campus life, including specifically members of the LGBTQ community. In this class I will work to promote an anti-discriminatory environment where everyone feels safe and welcome. I recognize that discrimination can be direct or indirect and take place at both institutional and personal levels. I believe that such discrimination is unacceptable and I am committed to providing equality of opportunity for all by eliminating any and all discrimination, harassment, bullying, or victimization. The success of this policy relies on the support and understanding of everyone in this class. We all have a responsibility not to be offensive to each other, or to participate in, or condone harassment or discrimination of any kind.

### **Inclusivity Statement (West Virginia University)**

The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion.

If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Office of Accessibility Services (293-6700). For more information on West Virginia University's Diversity, Equity, and Inclusion initiatives, please see <http://diversity.wvu.edu>. [adopted 2-11-2013]

### **Inclusivity Statement (University of Central Florida)**

The University of Central Florida considers the diversity of its students, faculty, and staff to be a strength and critical to its educational mission. UCF expects every member of the university community to contribute to an inclusive and respectful culture for all in its classrooms, work environments, and at campus events. Dimensions of diversity can include sex, race, age, national origin, ethnicity, gender identity and expression, intellectual and physical ability, sexual orientation, income, faith and non-faith perspectives, socio-economic class, political ideology, education, primary language, family status, military experience, cognitive style, and communication style. The individual intersection of these experiences and characteristics must be valued in our community.

Title IX prohibits sex discrimination, including sexual misconduct, sexual violence, sexual harassment, and retaliation. If you or someone you know has been harassed or assaulted, you can find resources available to support the victim, including confidential resources and information concerning reporting options at [www.shield.ucf.edu](http://www.shield.ucf.edu) and <http://cares.sdes.ucf.edu/>.

If there are aspects of the design, instruction, and/or experiences within this course that result in barriers to your inclusion or accurate assessment of achievement, please notify the instructor as soon as possible and/or contact Student Accessibility Services.

## **Academic Integrity Statement for Pitt Public Health Syllabi** *[copied as standalone policy from Pitt Public Health Syllabus Template]*

**The statement below details the school's policy that is required on all Pitt Public Health syllabi.**

*All students are expected to adhere to the school's standards of academic honesty. Any work submitted by a student for evaluation must represent their own intellectual contribution and efforts. The Graduate School of Public Health's policy on academic integrity, approved by EPCC on 10/14/08 and revised on 6/14/2010, which is based on the University policy, is available online in the Pitt Public Health Academic Handbook (section II) ([www.publichealth.pitt.edu/home/academics/academic-requirements](http://www.publichealth.pitt.edu/home/academics/academic-requirements)). The policy includes obligations for faculty and students, procedures for adjudicating violations, and other critical information. Please take the time to read this policy.*

*Students committing acts of academic dishonesty, including plagiarism, unauthorized collaboration on assignments, cheating on exams, misrepresentation of data, and facilitating dishonesty by others, will receive sanctions appropriate to the violation(s) committed. Sanctions include, but are not limited to, reduction of a grade for an assignment or a course, failure of a course, and dismissal from the school.*

*All student violations of academic integrity must be documented by the appropriate faculty member; this documentation will be kept in a confidential student file maintained by the Office of Student Affairs. If a sanction for a violation is agreed upon by the student and instructor, the record of this agreement will be expunged from the student file upon the student's graduation. If the case is referred to the Pitt Public Health Academic Integrity Hearing Board, a record will remain in the student's permanent file.*

The statement above in addition to a customized academic integrity statement from the faculty instructor can also be placed on course syllabi. That statement should also outline the guidelines and standards to which the students in the class will be held to by the faculty instructors. An example would be to include a statement as to whether students are or are not permitted to collaborate on homework or take-home exams.

# Educational Policies and Curriculum Committee

## Member Responsibilities

- Attend meetings or ensure that departmental representation will be in attendance in the form of department back-up representatives | [upcoming meeting schedule](#)  
Review meeting documents prior to meetings | [available here](#)
- Act as a liaison between your department and the committee, *including reporting updates to your department regularly.*
- Bring departmental concerns to the committee
- *Inform departmental faculty of the upcoming EPCC deadlines for proposal reviews*
- *Review syllabi from your department prior to EPCC submission.*

## *Notes updates*

## About being an EPCC member

- We wholeheartedly seek input from all members
- We value our student members' perspectives
- We are a green committee and no hard copies of meeting documents will be distributed - please feel free to bring a laptop or tablet to the meeting

## Charge of the Committee

The specific charge of the EPCC includes:

- Establish academic policies and procedures for the Graduate School of Public Health.
- Maintain and distribute to all faculty the policies and procedures document that contains the guidelines or criteria that relate to Pitt Public Health educational or curriculum matters.
- Update the policies and procedures document, as appropriate, with full review and re-approval at least every five years or when major changes in Pitt Public Health or University policy occur.
- Review and recommend action to Pitt Public Health Council on all curriculum changes.
- Assist the Dean and Associate Dean for Student Affairs and Education in the integration and coordination of the School's curriculum.
- Review and evaluate the School's educational courses and programs; core curriculum subcommittee of the EPCC also reviews and evaluates the School-wide core curriculum.
- Make recommendations to the Pitt Public Health Council on the implementation of educational policies.
- Review student academic performance three times annually; student representatives will be excused from these meetings.
- Establish and interpret admissions policies.
- Form ad hoc subcommittees, as may be necessary, to accomplish its charge effectively. Chairpersons of subcommittees normally should be members of EPCC but members of subcommittees can be drawn from the faculty at large.
- Meet on a monthly basis, or more often as necessary, to accomplish its charge. Interim meetings may be called at any time by the Chairperson or on request of three or more members or at request of Pitt Public Health Council.
- Make regular oral reports to the Pitt Public Health Council and provide a report summarizing its activities at least once each year at the School-wide faculty meeting

*Official committee bylaws governing the scope of the committee. Bylaws cannot be modified unless approved by the EPCC and the Graduate School of Public Health Council.*

# **Educational Policies and Curriculum Committee**

## *Terms of Office for Committee Members*

The elected faculty members of the EPCC serve three-year staggered terms. Elections to replace members whose terms have expired are held annually (see Section 9). Faculty elected to the EPCC may serve two successive terms and, thereafter, only following an interval of three years after the completion of the second term. Once an individual is elected as the Committee Chair, the term of office as the Committee Chair continues until the individual's term of office as a faculty representative to the EPCC expires. An individual can serve repeated tenures as Chair as long as he/she is a faculty representative of the EPCC.

## *Procedural Steps for Election of a New Chair*

The Chair of the EPCC must be chosen from the selected faculty representatives currently serving on the committee at their first meeting of the academic year. This meeting will be chaired by the outgoing chair. The election will be by secret ballot, with the results tallied immediately by the committee support staff person. The President of the FSEC will inform the Pitt Public Health Council of the results.

## **Recent Report Released by National Association for College Admission Counseling (NACAC)**

### **DEFINING ACCESS: HOW TEST-OPTIONAL WORKS**

In this study, Hiss, Syverson, and Franks collected student-record level data from 28 institutions that illustrate the variety among institutions that have adopted a test-optional policy (TOP). The institutions ranged in undergraduate enrollments from 1,500 to 20,000 and 15%-90% admit rates in selectivity, and included long-time users of TOP as well as recent adopters of the policy. In most instances the authors received four cohorts of student data, in total representing a dataset of 955,774 individual applicant records.

A TOP was described by many of the admission deans of the participating institutions as a tool they employed in the hope of increasing applications from a more diverse range of students, so this report focuses great attention on traditionally under-represented populations in American higher education. To do so, the authors used record-level data to identify the intersectionality of these underserved populations: First-Generation College Bound, students from lower SES backgrounds (Pell recipients as proxy), and students from racial and ethnic groups that have traditionally been underrepresented in college populations (URM). The authors identified students associated with any of these three groups and designated them as a single category of “Expanded Diversity,” and when possible, used it in their explorations.

The experiences of institutions in this study provide evidence that the adoption of a well-executed test-optional admission policy can lead to an increase in overall applications as well as an increase in the representation of URM students (both numeric and proportionate) in the applicant pool and the freshman class. Roughly two-thirds of the study’s TOP institutions experienced URM growth above that of a matched test-requiring peer institution. A similar but smaller magnitude increase was seen among Pell recipients.

Download the full report [here](#).

## **ASPPH Webinar – Holistic Admissions**

June 27 (2pm EST)

Summary: In this webinar admissions and student services staff will take a deep dive into what it means to have a holistic admissions process. Learning from the panelists and each other, participants will review enrollment management targets and how they fit into the holistic process, why it's important to review holistically, what this type of review means for each part of the application, and how to discuss with your faculty. Attendees will leave empowered to implement or re-align a holistic approach their review process.

Learning Outcome(s):

- Understand the meaning and importance of holistic review
- Identify successes and challenges of your admissions review process
- Describe the benefits of holistic review to faculty and deans

Registration and further details will be made available soon at:

[www.aspph.org/events/category/webinar/](http://www.aspph.org/events/category/webinar/)

## Scholarly Research on GRE Testing Bias

The majority of this research was completed by Robin Leaf, MEd as part of a white paper, *Predicting Student Success Utilizing Admissions Data*, in the fall of 2009 for Graduate School of Public Health Dean Donald Burke under the direction of then Associate Dean for Student Affairs and Education Dr. Sandra Quinn. By the request of the EPCC, further searching was completed for articles and data on GRE and other standardized testing biases in January/ February of 2017. Many of the articles cited in the 2009 report were surfacing in the search.

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Research was compiled from scholarly journals in addition to reports published by educational-related organizations, such as the Educational Testing Service (ETS), administering body for the GRE test, and the National Center for Fair & Open Testing, proponents of the testing optional movement. Literature was gathered from a variety of sources in order to provide an overall view of the foundational and current research on the use of standardized tests in admissions and graduate program admission practices. Specific factors' affecting the performance of minority applicants was also researched. The sources, including search terms, of this literature search are noted as well.

### *Attitudes Towards Standardized Tests*

Alon and Tienda (2007) contend that institutions with high rankings in periodicals such as U.S. News & World Report, do not necessarily need to improve on their admissions, curriculum, or resources and therefore the utilization of standardized tests as part of the admissions process is unnecessary. Institutions with high ranks are periodically those universities and colleges with extremely high admissions criteria, including standardized test scores.

A recent *Science* article from 2007 declares that their review of the literature makes the recommendation that tests such as the GRE and MCAT can predict student performance more adequately than undergraduate GPA. However, the defining purpose of standardized test scores is that they are to be utilized with other admissions data during the application review process and not viewed as a standalone factor in determining admission. The Educational Testing Service's 2009-10 *Guide to the Use of Scores*, for the GRE test, states that GRE tests are "to supplement undergraduate records and other qualifications for graduate study" (p.3). A study by Bowman (1998) of Master of Public Administration Programs concluded that applicants' GPA and GRE scores have some "limited predictive validity" however, the two "are more likely to decrease rather than increase the validity of admission decisions" (p. 873).

### *Testing Biases*

Testing bias is noted in the literature related to an applicant's, age, race, and ethnic/national origin. Studies on applicants with self-reported disabilities have also been conducted.

Age discrimination has been noted in the studies on admissions. As cited in the 1998 report from the National Center for Fair and Open Testing, ETS "concluded that the test under predicts the performance of women 25 years and older" (Rooney, p. 67). Dawes (1975) study on admission

## Scholarly Research on GRE Testing Bias

data related to student success in one psychology program at a public research university resulted in depicting bias for non-traditional students. These students as a cohort had high GRE scores but low undergraduate GPA.

ETS notes in its 2009-10 report on *The Guide to the Use of the GRE Scores* that “special care is required in interpreting the GRE scores of students who may have had educational and cultural experiences somewhat different from those of the traditional majority” (p. 7). They continue in the report to illustrate the care needed when reviewing the scores of international student whose first language is not English. Reviewing the Test of English as a Foreign Language (TOEFL) is encouraged as part of a comprehensive application review. A study by Stricker (2002), as detailed in an ETS report, indicated that “because an ESL [English as a Second Language] test is easier than a verbal ability test and similar verbally loaded admissions tests designed for English-speaking test-takers can discriminate among test-takers at lower levels of verbal ability in English” (p.3). This disadvantage of ELS applicants is noted in the 2007 ETS study of the analytical writing component of the GRE test, whereby they find this section of the test to be more challenging than their counterparts whose first language is English (Stricker, 2002).

In regards to applicants with self-reported disabilities, ETS encourages schools to waive the GRE test component, if required as part of the application package. ETS states that “the examinee’s scores may not fully reflect his or her educational achievement and, because there are so few disabled persons taking the GRE test with varied circumstances” (ETS, 2009, p. 8).

With regards to race, a 1985 study at the University of Florida concluded that “the relationship between GRE scores and graduate GPA is not the same for both black and white students” (Scott and Shaw, p. 21). This is depicted in the results where “a black student who earns a GRE score of 600 will be expected to earn a grade point average of 3.44, while a white student who earns the same GRE score would be expected to earn a grade-point average of 3.34” (Scott and Shaw, p. 22). On the Analytical Writing component of the GRE, the Educational Testing Service in a report cites racial differences where African Americans and Hispanics have decreased scores compared to Caucasians (2007).

### *Application Review Reform*

Guidelines for application review are available from the ETS and list such criteria for application reviewers to use a various measures of achievement including undergraduate GPA, letters of recommendation, samples of academic work, and professional achievement. These guidelines also state that the Verbal, Quantitative, and Analytical Writing scores of the GRE are not to be combined as one GRE score utilized as a cut-off for admission (ETS, 2009).

The literature also recommends that application reviewers must take into consideration the variance of academic rigor, or quality of, undergraduate institutions and range of factors affecting a student’s undergraduate GPA, which includes individual instructor and departmental grading policies (Williams & Johnston, 1963, Houston, 1968, Hansen, 1971, Vecchio and Costin, 1977). A study of economic graduate student performance led Hansen to assert the need for an analysis

## Scholarly Research on GRE Testing Bias

of the quality of an applicant's undergraduate institution when applying any admission opinion on cumulative undergraduate GPA (1971). Kuncel and Hezlett (2007) state that "the strongest predictors are tests with content specifically linked to the discipline" of the student (p. 1080). A study by Zwick (1993) offered similar results as (1993) the analysis of doctoral business students concluded that the highest level of prediction of successes was the utilization of the GMAT verbal and GMAT quantitative scores with undergraduate GPA. Similarly, in 1967 Stricker and Huber indicated that grades earned in students' graduate major along with GRE quantitative and subject test scores offer highest correlation to student success, which was defined in the study as passing the doctoral oral exam.

### *Future of Standardized Admissions Testing*

Studies of the connection between standardized test scores and student success have been conducted for the past 80 years (Kuncel and Hezlett, 2007). The standardized testing movement grew in popularity as way of streamlining admissions processes during time of growth in higher education where inefficiencies were lacking. (Alon and Tienda, 2007). Uses of these tests have primarily been to establish a common yard stick among applicants (Rooney, 1998, p. 3). Oldfield and Ritter state that GRE scores show very little association with achievement in an academic program (1996). They also note numerous times in their paper (Oldfield and Ritter, 1996) that there has not been enough study of the validity of the GRE test.

However, there is a movement among undergraduate institutions to waive or eliminate standardized tests as part of the application for admission. This is in response to legislative actions banning racial preferences in admissions, in the states of California and Texas (Rooney, 1998). As of the fall 2009 semester, over 830 undergraduate institutions that have eliminated or altered their mandatory standardized test as an admissions requirement (National Center for Fair and Open Testing, n.d.). Graduate level programs at institutions such as Harvard, Brown, and Columbia have minimized their reliance on admissions test and are completing comprehensive application reviews of the materials such as undergraduate academic performance, interview, admissions essays, and writing samples (National Center for Fair and Open Testing, 2007). A few of the benefits, as related to graduate education, of the test optional movement from the National Center for Fair and Open Testing are as follows: recruitment of stronger academic classes, diversification of student population, and resource savings as institutions for the majority of the time do not need to rank or sort their application pool as other admissions criteria takeover fulfill the need for test scores (Rooney, 1998).

## Scholarly Research on GRE Testing Bias

### *Completed Literature Search*

<b>Journal Abstracting/ Indexing Source</b>	<b>Search Terms</b>	<b>Specific Disciplines/Areas Searched</b>
EBSCOhost	GRE and graduate, GRE and admission, admission and graduate, standardized test and admission, health occupations, public health, minority students, Graduate Record Exam, Educational testing and measures, English language, Test of English as a Foreign Language	Academic Premier and Educational Administration Abstracts
Educational Testing Service (ETS) Reports	GRE and administrators/educators, TOEFL and GRE, TOEFL and administrators/educators	
JSTOR	GRE and graduate, GRE bias, GRE and admission, admission and graduate, standardized test and admission, health occupations, public health, minority students, Graduate Record Exam, Educational testing and measures, English language, Test of English as a Foreign Language	Biological Sciences, Education, General Science, Health Policy, Health Sciences, and Psychology
PubMed	Medical school admissions, admission and performance, GRE and admission, Graduate Record Exam	

# Scholarly Research on GRE Testing Bias

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**Graduate School of Public Health**  
**Educational Policies and Curriculum Committee**  
**Meeting Minutes | May 3, 2018**

Present: Jessica Burke, Yue Chen, Mary Derkach, Ying Ding, Julia Driessen, Jim Fabisiak, David Finegold, Nancy Glynn, Summer Haston, Robin Leaf, Kimmy Rehak, and John Shaffer.

The meeting was called to order at 1:32 p.m. by Dr. Patricia Documet, chair.

**New Course: EPIDEM XXXX *Applied Epidemiology Field Investigation Methods*** | Lauren Orkis

Dr. Orkis presented an application for a new course that's purpose is to orient students to urgent public health field issues and specific methods that would be utilized in the cases of infectious outbreak, including: surveillance, data collection, interviewing skills, and so on. This class should introduce students to applied epidemiology skills to use in non-academic settings and would feature guest lectures in the second half of the course.

**ACTION:** The committee approved the course with changes that included settling on a course name and assigning 100% effort to the instructor.

**New Course: EPIDEM XXXX *Advanced Topics in Molecular Epidemiology*** | Jennifer Adibi

Dr. Adibi presented an application for a new course meant to replace EPIDEM 2601. The former, a three-credit, doctoral-level class, was cancelled due to low enrollment, and is to be replaced by a one-credit, half-semester course. This course aims to get students into the lab by providing demonstrations on eight practical topics. The committee expressed concern that EPIDEM 2600 pre-requisite requirement would result in another course with low enrollment and it was suggested that students with relevant lab experience could get approval from the instructor to take this course. A question about the Learning Objectives was also raised as a number of them did not include measurable, active verbs.

**ACTION:** The committee conditionally approved the course, provided that Dr. Adibi can present changes to the syllabus at the June 7, 2018 EPCC meeting. These changes include: unpacking the active participation requirement by including a discrete and explicit description of criteria for grading, considering a lowering of the participation percentage and an increasing of the weighting for assignments, including more details about the assignments and metrics for how assessments will be graded on the syllabus, modifying the course Learning Objectives to comply with measureable outcomes, changing the class time to one hour and fifty minutes to satisfy the one credit hour designation, having a new class number assigned, and considering a removal of the EPIDEM 2600 pre-requisite requirement to open up this course to qualified students from other departments.

**New Course Revisit: IDM XXXX *Scientific Communication*** | Josh Mattila

Dr. Josh Mattila revisited the committee to present an updated syllabus that was first presented at the March 29 (for April) 2018 EPCC meeting. He explained that, as requested, he had capped the class size and had decided to set the limit at 20 students in order to allow for a reasonable workload with regards to grading student writing submissions. Other changes to the

syllabus included: adding assignments, lengthening class time to one hour and fifty minutes, and clarifying in-class and out-of-class assignments. The class participation grade—70% of the overall course grade—was questioned and Dr. Mattila explained that he had planned to calculate the grade by having students give feedback and self-evaluate their works.

**ACTION:** No action needed. The committee did require that a follow up email be sent specifying that Dr. Mattila consider unpacking the participation requirement by including a discrete and explicit description of criteria for grading, considering a lowering of the participation percentage and an increasing of the weighting for assignments, and adding an active verb to make Learning Objective #2 measureable.

### **Approval of March 29 (for April) Meeting Minutes | All**

The Committee approved the March 29 (for April) meeting minutes.

The meeting was adjourned at 2:57 p.m.

Upcoming meetings:

June 7, 1:30-3:30pm, room 1149

July 26, 1:30-3:30pm, room 1149 | Deadline for new fall 2018 courses