



April 29, 2015

Scott Herness  
Associate Dean  
The Graduate School  
250 University Hall  
230 North Oval Mall  
CAMPAS

Dear Dean Herness,

Thank you for the feedback regarding the curriculum changes for the Interdisciplinary Biostatistics PhD Program (BiostatPhD). The BiostatPhD curriculum committee has met and discussed the feedback. The committee also reviewed the curriculum to ensure that the changes do not result in the loss of essential core content. Please find the attached document with detailed explanation and rationale on the changes.

Enclosed in this email, please find

- A document explaining the rationale for the change of the qualifying exam and the corresponding changes in the curriculum.
- The proposed curriculum as approved by all Biostatistics faculty.

If the Graduate School needs any additional information, please let me know. Thank you for your time and consideration of this request.

Sincerely,

Bo Lu, PhD  
Graduate Studies Committee Chair  
Interdisciplinary Biostatistics PhD



March 4, 2015

Dr. Bo Lu, Graduate Studies Chair  
College of Public Health

## Interdisciplinary Biostatistics PhD Program

Bo,

The Graduate School Curriculum Committee (GSCC) met on February 26<sup>th</sup> and, among its agenda items, considered the proposal to change the curriculum of two specializations within the interdisciplinary Biostatistics PhD program. As a result of the change in the qualifying exam for the Methodology and the Public Health specializations, (effective Autumn 2015), their curricula has been revised.

The committee would appreciate some further explanation of the curricular changes. Though the justification for these changes may well be benign, their rationale isn't explicitly stated. Some description would be helpful for review. It is assumed that the substitution of core courses, removal of some required courses and replacement by others, does not result in the loss of essential core content. Additionally, it is assumed that the change in the total credit hours for each specialization has not altered the total credit hours for the degree.

Part of the purpose of the GSCC review is to not only ensure that the degree meets Graduate School requirements, but also to strengthen the proposal for its subsequent approval steps. Following approval by the GSCC, the proposal will be submitted to the Graduate Council followed by Committee on Academic Affairs for their reviews.

Please submit a revised copy of the proposal to me or my administrative assistant, Jill Toft(.20).

As always, I am available for any questions or clarifications.

Many thanks,

Scott Herness  
Associate Dean  
The Graduate School

## Interdisciplinary PhD Program in Biostatistics: Program Change

### Qualifying Exam Change

Under the current practice, the two specializations of the Interdisciplinary PhD Program in Biostatistics (BiostatPHD), namely Methodology Specialization (BME) and Public Health Specialization (PHB), have the same qualifying I exam (usually offered by the end of the first year) but two different qualifying II exams (usually offered by the end of the second year). The two qualifying II exams have different emphases on topic coverage and consequently require different core curricula. This not only creates issues in coordination of core course offerings, but generates confusion among students and unnecessary fragmentation of the program as well.

To improve the learning experience and integrate the operation of the program, the Biostatistics faculty plans to offer the same qualifying II exam for all students in this program, regardless of specialization. This was approved in the full BiostatPHD faculty meeting in April 2014. We propose this qualifying exam change be effective for students enrolling in BiostatPHD starting Fall 2015, pending the approval from the Graduate School.

### Curriculum Change

As a result of the proposed qualifying exam II change, the curriculum for each specialization has also been revised to create a statistical core common to both specializations that is augmented by core specialization courses that differ between the BME and PHB specializations. The BiostatPHD faculty has discussed this in multiple meetings and came to the conclusions that:

1. The changes do not result in the loss of essential core content of the BiostatPHD program.
2. The total credit hours required for the degree (80) do not change.
3. The changes in credit hours for courses are small for both specializations. For BME, the credit hours for courses drop from 64 to 60; for PHB, the credit hours for courses drop from 62 to 61.
4. In the BME specialization, the credit hours for required courses drop by 1 credit hour (53 to 52) because of changes to the core courses as described below. The credit hours for elective courses drop by 3 credit hours (11 to 8), which allows students to start their dissertation research earlier. Also the total credit hours for courses now is comparable to the requirements of the PHB specialization and the PhD degree in Statistics.
5. In the PHB specialization, the credit hours for required courses increase by 5 credit hours (44 to 49), which increases formal training on Biostatistical theory. The credit hours for elective courses drop by 6 credit hours (12 to 6) and the credit hours for cognate area remain unchanged, which ensures the total credit hours for courses is comparable to BME specialization and the PhD degree in Statistics.

### Rationale for Specific Course Changes

The revised curricula are provided in a separate document. The current curricula for both specializations can be found at <http://biostatprograms.osu.edu/methodology-specialization> and <http://biostatprograms.osu.edu/public-health-specialization>. The following tables summarize the changes made to the current curriculum and rationales for specific course changes are provided.

#### *Methodology Specialization*

	Old	New
<b>Credit hour summary</b>		
Total credit hours	80	80
Total credit hours for courses	64	59/60
Total credit hours for required courses	53	51/52
Total credit hours for electives	11	8
<b>Course changes for the creation of the common statistics core</b>		
STAT6570 (2)	Not required	Required core course (note 1)
STAT7430 (3)	Not required	Required core course (note 2)
<b>Course changes for the creation of the BME specialization core</b>		
PUBHEPI 6410 (3) PUBHBIO 7215 / STAT 6615 (2) STAT 8625/ STAT 6625 (3)	PUBHBIO7215/STAT 6615 required STAT 8625 required	Choose two out of the three (note 3)
STAT 7302 (3)	Required core course	Not required (note 4)
PUBHBIO 8230/ STAT 7470 (3)	Required core course	Not required (note 5)

1. STAT 6570 on Applied Bayesian Analysis is required now to expose students to modern Bayesian analysis techniques that have become very popular in Biostatistics research.
2. STAT 7430 on Generalized Linear Model is required now to prepare students for handling different nonlinear outcomes that are very common in Biostatistics research.
3. Adopting the structure of “choose two out of the three” gives students more flexibility to prepare themselves for research topics of their interests.
4. STAT 7302 is a second course of advanced statistical theory, which is not deemed necessary for all Biostatistics PhD students.
5. PUBHBIO 8230/ STAT 7470 is the cross-listed advanced longitudinal data analysis, which is considered to be a specialized topic and is not necessary for all students.

*Public Health Specialization*

	Old	New
<b>Credit hour summary</b>		
Total credit hours	80	80
Total credit hours for courses	62	61
Total credit hours for required courses	44	49
Total credit hours for cognate	6	6
Total credit hours for electives	12	6
<b>Course changes for the creation of the common statistics core</b>		
MATH 4545 (4)	Not required	Required math course (note 1)
STAT 6570 (2)	Not required	Required core course (note 2)
STAT 7301 (3)	Not required	Required core course (note 3)
<b>Course changes for the creation of the PHB specialization core</b>		
PUBHEPI 6410 (3)	Not required	Required epidemiology course (note 4)
PUBHEPI 6430 (4)	Required core course	Not required (note 4)
PUBHBIO 8230/ STAT 7470 (3)	Required core course	Not required (note 5)

1. MATH 4545 on Mathematical Analysis is required now to prepare Biostatistics PhD students with the mathematical analysis tool to understand advanced Statistical theory (STAT 7301).
2. STAT 6570 on Applied Bayesian Analysis is required now to expose students to modern Bayesian analysis techniques that have become very popular in Biostatistics research.
3. STAT 7301 on Advanced Statistical Theory provides Biostatistics PhD students with the necessary theoretical statistical knowledge for their dissertation research.
4. PUBHEPI 6430 is replaced with PUBHEPI 6410 since the computer lab experience in 6430 is not needed for Biostatistics PhD students who are already required to take a more advanced statistical computing class (STAT 7730).
5. PUBHBIO 8230/ STAT 7470 is the cross-listed advanced longitudinal data analysis course, which is considered to be a specialized topic and is not necessary for all students.

# Interdisciplinary PhD Program in Biostatistics

## Common Core Curriculum (Sample)

<b>First Year</b>	MATH 4545 (Analysis)	4	<b>STAT 6570 (Appl Bayes)</b>	2
	<b>STAT 6801 (Stat Theory I)</b>	4	<b>STAT 6802 (Stat Theory II)</b>	4
	<b>STAT 6910 (Appl Stat I)</b>	4	<b>STAT 6860 (Found Lin Mod)</b>	2
			<b>STAT 6950 (Appl Stat II)</b>	4
<b>Second Year</b>	<b>STAT 7301 (Adv Stat Theory I)</b>	3	<b>STAT 7430 (GLM)</b>	3
	<b>STAT 7410 (Theory of Lin Mod)</b>	3	<b>PUBHBIO 8235 (Adv Survival)</b>	3
	<i>Core Course</i>	3	<i>PUBHBIO 7245 / STAT 7755 (Biostat Collab)</i>	2
			<i>STAT 6615/PUBHBIO 7215 (Clinical Trials)</i>	2
<b>Third Year</b>	<i>STAT 7730 (Stat Computing)</i>	3	Core course	3
	Core course	3	Elective	3
	Elective	3	Elective	2

### Notes:

(1) Courses in **bold font** above form the Common Core – these courses are covered on the QII exam.

(2) Courses in *italic font* above form the Common Required courses – these courses are required by both specializations.

QI Exam: Year 1 courses, administered by the Statistics Department.

QII Exam: Year 1 courses, Stat 7301, Stat 7410, Stat 7430, PUBHBIO 8235

The QII exam will consist of one 4 hour in-class session and two 4-hour computer lab sessions, administered by the Interdisciplinary Biostatistics Program.

## **Methodology Specialization**

In addition to the common core curriculum, students in the methodology specialization are required to take:

Core advanced Statistics: Stat 7201 (Probability), Stat 7540 (Stoch Proc),

Core Biostatistics Electives (pick 2): Stat 8625/6625 (Stat Genetics), Stat 6615 (Clinical Trials), PUBHEPI 6410 (Intro Epi)

Additional electives: 8 hours

<b>Methodology Specialization</b>		
<b>Area/Course</b>	<b>Title</b>	<b>Credits</b>
<b>MATH</b>		
MATH 4545	Analysis Overview	4
		<b>Core Math credits: 4</b>
<b>CORE STATISTICS</b>		
STAT 6570	Applied Bayesian Analysis	2
STAT 6801	Statistical Theory I	4
STAT 6802	Statistical Theory II	4
STAT 6860	Foundations of the Linear Model	2
STAT 6910	Applied Statistics I	4
STAT 6950	Applied Statistics II	4
PUBH 7245/STAT 7755	Biostatistical Collaboration	2
STAT 7301	Advanced Statistical Theory I	3
STAT 7410	Theory of the Linear Model	3
STAT 7730	Advanced Statistical Computing	3
STAT 7430	Generalized Linear Model	3
PUBH 8235	Adv Regr Model for Time-to-Event Data	3
or STAT 8605	Advanced Survival Analysis	3
		<b>Core Statistics credits: 37</b>
<b>CORE ADVANCED STATISTICS</b>		
STAT 7201	Theory of Probability	3
STAT 7540	Theory of Stochastic Processes	3
		<b>Advanced Statistics credits: 6</b>
<b>CORE BIOSTATISTICS (Pick Two)</b>		
PUBHEPI 6410	Intro to Epidemiology	3
PUBHBIO 7215 / STAT 6615	Clinical Trials	2
STAT 8625/6625	Stat Methods for Analyzing Genetic Data	3
		<b>Core Biostatistics credits: 5/6</b>
<b>ELECTIVES</b>		
6000-level STAT or 7000-level PUBHBIO		8
		<b>Electives credits: 8</b>
		<b>Total Course Credit Hours: 60/61</b>



## **Public Health Specialization**

In addition to the common core curriculum, students in the public health specialization are required to take: PUBHEPI 6410 (Intro Epi), Stat 6540 (Appl Stoch Proc), Stat 6615 (Clinical Trials)

Cognate: 6 hours

Additional electives: 6 hours

## Public Health Specialization

Area/Course	Title	Credits
<b>CORE MATH</b>		
MATH 4545	Analysis Overview	4
		<b>Core Math credits: 4</b>
<b>CORE STATISTICS</b>		
STAT 6570	Applied Bayesian Analysis	2
STAT 6801	Statistical Theory I	4
STAT 6802	Statistical Theory II	4
STAT 6860	Foundations of the Linear Model	2
STAT 6910	Applied Statistics I	4
STAT 6950	Applied Statistics II	4
PUBHBIO 7245 / STAT 7755	Biostatistical Collaboration	2
STAT 7301	Advanced Statistical Theory I	3
STAT 7410	Theory of the Linear Model	3
STAT 7430	Generalized Linear Models	3
STAT 7730	Advanced Statistical Computing	3
PUBHBIO 8235	Adv Regr Model of Time-to-Event Data	3
		<b>Core Statistics credits: 37</b>
<b>CORE BIOSTATISTICS</b>		
PUBHBIO 7215 / STAT 6615	Clinical Trials	2
STAT 6540	Applied Stochastic Processes	3
or STAT 7540	Theory of Stochastic Processes	3
		<b>Core Biostatistics credits: 5</b>
<b>EPIDEMIOLOGY</b>		
PUBHEPI 6410	Intro to Epidemiology	3
		<b>Epidemiology credits: 3</b>
<b>COGNATE</b>		
Courses in a health-related field outside of statistics/biostatistics		6
		<b>Cognate credits: 6</b>
<b>ELECTIVES</b>		
6000-level STAT or 7000-level PUBHBIO		6
		<b>Electives credits: 6</b>
		<b>Total Credit Hours: 61</b>