

Status: PENDING

PROGRAM REQUEST
Biostatistics

Last Updated: Myers,Dena Elizabeth
01/07/2011

Fiscal Unit/Academic Org	Statistics - D0694
Administering College/Academic Group	Arts And Sciences
Co-administering College/Academic Group	Public Health
Semester Conversion Designation	Re-envisioned with significant changes to program goals and/or curricular requirements (e.g., degree/major name changes, changes in program goals, changes in core requirements, structural changes to tracks/options/courses)
Current Program/Plan Name	Biostatistics
Proposed Program/Plan Name	Biostatistics
Program/Plan Code Abbreviation	BIOSTAT-PH
Current Degree Title	Doctor of Philosophy

Credit Hour Explanation

Program credit hour requirements		A) Number of credit hours in current program (Quarter credit hours)	B) Calculated result for 2/3rds of current (Semester credit hours)	C) Number of credit hours required for proposed program (Semester credit hours)	D) Change in credit hours
Total minimum credit hours required for completion of program		120	80.0	80	0.0
Required credit hours offered by the unit	Minimum	120	80.0	80	0.0
	Maximum	120	80.0	80	0.0
Required credit hours offered outside of the unit	Minimum	0	0.0	0	0.0
	Maximum	0	0.0	0	0.0
Required prerequisite credit hours not included above	Minimum	0	0.0	0	0.0
	Maximum	12	8.0	4	4.0

Program Learning Goals

Note: these are required for all undergraduate degree programs and majors now, and will be required for all graduate and professional degree programs in 2012. Nonetheless, all programs are encouraged to complete these now.

Program Learning Goals

Assessment

Assessment plan includes student learning goals, how those goals are evaluated, and how the information collected is used to improve student learning. An assessment plan is required for undergraduate majors and degrees. Graduate and professional degree programs are encouraged to complete this now, but will not be required to do so until 2012.

Is this a degree program (undergraduate, graduate, or professional) or major proposal? Yes

Does the degree program or major have an assessment plan on file with the university Office of Academic Affairs? No

Program Specializations/Sub-Plans

If you do not specify a program specialization/sub-plan it will be assumed you are submitting this program for all program specializations/sub-plans.

Program Specialization/Sub-Plan Name Methodology (Existing)
Program Specialization/Sub-Plan Goals

Program Specialization/Sub-Plan Name Public Health (Existing)
Program Specialization/Sub-Plan Goals

Status: PENDING

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Pre-Major

Does this Program have a Pre-Major? No

Attachments

- PhD_Biostat_Attachments.pdf: Documents from the Program in Biostatistics
(Program Proposal. Owner: Craigmile,Peter F)
- Biostatistics PhD cover letter.doc: NMS Division of Arts and Sciences cover letter
(Letter from the College to OAA. Owner: Andereck,Claude David)

Comments

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Craigmile,Peter F	12/10/2010 03:18 PM	Submitted for Approval
Approved	Craigmile,Peter F	12/10/2010 03:23 PM	Unit Approval
Revision Requested	Andereck,Claude David	12/15/2010 12:32 PM	College Approval
Submitted	Craigmile,Peter F	01/04/2011 03:53 PM	Submitted for Approval
Approved	Craigmile,Peter F	01/04/2011 03:55 PM	Unit Approval
Approved	Andereck,Claude David	01/07/2011 04:08 PM	College Approval
Approved	Myers,Dena Elizabeth	01/07/2011 04:10 PM	GradSchool Approval
Pending Approval	Soave,Melissa A	01/07/2011 04:10 PM	CAA Approval



College of Arts and Sciences

186 University Hall
230 North Oval Mall
Columbus, OH 43210

Phone (614) 292-8908
Fax (614) 247-7498

January 7, 2011

Dena Myers
Graduate School
250 University Hall
230 North Oval Mall
Campus

Dear Dena:

It is a pleasure to forward to you the proposal for the doctoral program in Biostatistics under semesters. The program has two specializations, one in Public Health and the other in Methodology. The department proposes some a number of changes to the quarter-based program, including modernization and re-packaging of course materials, rearrangement of required courses vs electives, along with changes in prerequisites for the Methodology specialization and the addition of a cognate study requirement for the Public Health Specialization.

The proposed program has been approved by both the Department of Statistics and the School of Public Health, with faculty from both units working together to produce the proposal that you have. Beyond my own review of the documents, the proposal has been discussed by colleagues from other NMS units at a meeting on December 15, 2010. Feedback from these discussions has been incorporated in the proposal.

If you have any questions, I would be happy to address them.

Sincerely,

A handwritten signature in black ink, appearing to read "David Andereck".

David Andereck
Professor of Physics
Associate Dean of Natural and Mathematical Sciences, College of Arts and Sciences



Department of Statistics

404 Cocksins Hall
1958 Neil Avenue
Columbus, OH 43210-1247

Phone (614) 292-2866
Fax (614) 292-2096

December 10, 2010

To: Office of Academic Affairs

Re: Proposed Biostatistics Ph.D.

Please find attached our proposal for the **Ph.D. in Biostatistics** under semesters. This degree is offered by the Graduate Program in Biostatistics consisting of Biostatistics faculty in the Department of Statistics in the College of Arts and Sciences, as well as faculty in the Division of Biostatistics in the College of Public Health. The ad-hoc Ph.D. in Biostatistics conversion committee put this proposal together, with continual feedback from the faculty involved in the Graduate Program. It was approved unanimously in a meeting of the two groups of faculty on November 4, 2010.

Sincerely,

A handwritten signature in cursive script that reads 'Douglas A. Wolfe'.

Douglas A. Wolfe
Professor and Chair



College of Public Health

Division of Biostatistics
M-116 Starling-Loving Hall
320 W. 10th Ave.
Columbus, OH 43210

Phone (614) 293-7826
Fax (614) 293-3937
Web <http://eph.osu.edu>

9 December 2010

To: Office of Academic Affairs

Re: Proposed Biostatistics PhD

Please find attached our proposal for the **Ph.D. in Biostatistics** under semesters. This degree is offered by the Program in Biostatistics consisting of Biostatistics faculty in the Department of Statistics in the College of Arts and Sciences, as well as faculty in the Division of Biostatistics in the College of Public Health. The ad-hoc Ph.D. in Biostatistics conversion committee put this proposal together, with continual feedback from the faculty involved in the Program. It was approved unanimously in a meeting of the two groups of faculty on 4th November 2010.

Sincerely,

A handwritten signature in cursive script that reads "H. N. Nagaraja".

H. N. Nagaraja,

Chair, Division of Biostatistics

Proposed Ph.D. in Biostatistics

Rationale for Changes

The changes to the Methodology Specialization are summarized as follows:

1. The quarter-based courses on Regression and Experimental Design are replaced with an integrated, year-long sequence (Stat 6910/6950, each 4 semester credits) on Applied Statistics. This sequence includes additional material currently scattered over a number of elective courses.
2. The course Stat 6860, *Foundations of the Linear Model* (2 semester credits), has been introduced. Stat 6860 presents background material for the study of Linear Models (Stat 7410, see below).
3. The time spent on mathematical prerequisites is reduced, with this coursework replaced, in part, by preparation for a theoretical treatment of the linear model, and a targeted applied course on clinical trials (Stat 6615 – 3 semester credits).
4. The Stat 722/723 quarter probability sequence (each 4 quarter credits) and the quarter course Stat 832 (3 quarter credits) have been replaced by two 3 semester credit courses, one on theoretical probability (Stat 7201-3 semester credits) and one on stochastic processes (Stat 7540-3 semester credits). Stat 7540 adds material on Gaussian processes.
5. The following required courses/sequences have substantially increased the amount of contact hours, allowing additional material to be added:
 - a. The quarter course Stat 742 (4 quarter credits) has been replaced by the semester course Stat 7410 (4 semester credits), adding material on generalized linear models.
 - b. The quarter course Stat 773 (3 quarter credits) has been replaced by the semester course Stat 7730 (3 semester credits), adding material on Monte Carlo methodology.
 - c. The quarter courses Stat 820/821 sequence (each 3 quarter credits) has been replaced by the two 3 semester credit courses Stat 7301 and Stat 7302, adding material on simultaneous hypothesis testing.
 - d. The quarter course Stat 833 (3 quarter credits) has been replaced by the semester course Stat 8625 (3 semester credits). The topics have been expanded to cover methods for analyzing data from recent advances in molecular technologies, including second generation sequencing data and detection of non-Mendelian effects, such as maternal and imprinting effects.
6. Due to increases in the required courses, the program has decreased the total hours of electives from 22 quarter credits to 11 semester credits. The sample list of electives has been updated to reflect some of the courses that will be available under semesters. The total number of semester credit hours required for the PhD is 80.

The changes to the Public Health Specialization are summarized as follows:

1. The quarter-based courses on Regression and Experimental Design are replaced with an integrated, year-long sequence (Stat 6910/6950, each 4 semester credits) on Applied Statistics. This sequence includes additional material currently scattered over a number of elective courses.
2. The course Stat 6860, *Foundations of the Linear Model* (2 semester credits), has been introduced. Stat 6860 presents background material for the study of Linear Models (Stat 7410, see below).
3. The following required courses/sequences have substantially increased the amount of contact hours, allowing additional material to be added:
 - a. The quarter course Stat 773 (3 quarter credits) has been replaced by the semester course Stat 7730 (3 semester credits), adding material on Monte Carlo methodology.
 - b. The quarter course Stat 743 (3 quarter credits) has been replaced by one 3 semester credits course (Stat 7430) adding material on modeling non-Gaussian data, and greater depth on multivariate and longitudinal generalized models.
4. The following courses that were previously electives under quarters have been changed to required under semesters, reflecting a reprioritization and need for greater knowledge in certain topics in the expanding field of Biostatistics.
 - a. The quarter course Stat 632 (3 quarter credits) has been replaced by the semester course Stat 6540 (3 credit semester credits) on Applied Stochastic Processes, adding material on discrete state space continuous time Markov chains and coalescent theory models.
 - b. The quarter course Stat 742 (4 quarter credits) has been replaced by the semester course Stat 7410 (4 semester credits), adding material on general linear models.
5. The following courses that were required under quarters have been changed to electives under semesters, reflecting increased diversity in biostatistical topics and need for committee guidance in tailoring a student's plan of study:
 - a. Statistical Methods for Analyzing Genetic Data (was Stat 833 / now Stat 8625, 3 semester credits)
 - b. Survey Sampling (was PUBHBIO 651/STAT 651; now PUBHBIO 7225/STAT 6510, 3 semester credits)
 - c. Applied Statistical Analysis with Missing Data (was PUBHBIO 652/STAT 652; now PUBHBIO 7240/STAT 6520, 3 semester credits)
 - d. Applied Logistic Regression (was PUBHBIO 606 / now PUBHBIO 7220, 3 semester credits)
6. The following courses that were required under quarters have been removed from the curriculum under semesters. A higher level version of these courses are contained in other required courses.
 - a. Design & Analysis of Studies in Health Sciences I (PUBHBIO 701 / PUBHBIO 6210)
 - b. Design & Analysis of Studies in Health Sciences II (PUBHBIO 702 / PUBHBIO 6211)
 - c. Problem-Oriented Approach to Biostatistics (PUBHBIO 703 / PUBHBIO 6212)
 - d. Applied Survival Analysis (PUBHBIO 605/BIOSTAT 605 ; PUBHBIO 7235 / STAT 6605)
7. The epidemiology requirement under quarters (PUBHEPI 710, 4 quarter credits) has been

replaced with a new semester epidemiology course that includes a lecture (PUBHEPI 6430.01, 3 semester credits) plus a lab (PUBHEPI 6430.02, 1 semester credit). The increased credit hours reflect the converted program's increased emphasis on applications, including this course as well as the new cognate requirement.

8. To reflect the interdisciplinary nature of biostatistics, a new cognate requirement has been added. The program will require 6 semester credits outside statistics / biostatistics, in a health-related field, as approved by the student's PhD Examination Committee.
9. The program has increased the total hours of electives (13 quarter credits to 12 semester credits), reflecting increased diversity in biostatistical topics and the need for committee guidance in tailoring a student's plan of study. The sample list of electives has been updated to reflect some of the courses that will be available under semesters. The total number of semester credit hours required for the PhD is 80.

Proposed Ph.D. in Biostatistics - Methodology Specialization
List of Semester courses

Math Prerequisite (4 credits)

Under Semesters			Under Quarters		
Code	Credits	Title	Code	Credits	Notes
Math 4545	4	Tentative title: "Survey of topics in analysis"			New course - still under discussion with Mathematics

Core Required Courses (49 credits)

Under Semesters			Under Quarters		
Code	Credits	Title	Code	Credits	Notes
PUBHBIO 7245 / STAT 7755	2	Biostatistical Collaboration	PUBHBIO 786/ BIOSTAT 709	3	straight conversion (name change, cross-list added)
PUBHBIO 8230 / STAT 7470	3	Advanced Longitudinal Data Analysis	PUBHBIO 726 / STAT 726	4	Modernized, with enhanced or added material
PUBHBIO 8235	3	Advanced Regression Modeling of Time-to-Event Data	PUBHBIO 706	4	Modernized, with enhanced or added material
STAT 6615	2	Design and Analysis of Clinical Trials	BIOSTAT 615	3	Straight conversion
STAT 6801	4	Statistical Theory I	STAT 620/621	4 + half of 4	Straight conversion of sequence
STAT 6802	4	Statistical Theory II	STAT 621/622	half of 4 + 4	Straight conversion of sequence
STAT 6860	2	Foundations of the Linear Model			New course
STAT 6910	4	Applied Statistics I	STAT 641	5	Modernized, with enhanced or added material
STAT 6950	4	Applied Statistics II	STAT 645	5	Modernized, with enhanced or added material
STAT 7201	3	Theory of Probability	STAT 722/723	4+4	Some material has been removed; other material has been moved to Stat 7540
STAT 7301	3	Advanced Statistical Theory I	STAT 822	3	Modernized, with enhanced or added material
STAT 7302	3	Advanced Statistical Theory II	STAT 821	3	Modernized, with enhanced or added material
STAT 7410	3	Theory of the Linear Model	STAT 742	3	Modernized, with enhanced or added material
STAT 7540	3	Stochastic Processes	STAT 832	3	Modernized, with enhanced or added material
STAT 7730	3	Advanced Computational Statistics	STAT 773	3	Modernized, with enhanced or added material
STAT 8625	3	Statistical Methods for Analyzing Genetic Data	STAT 833	3	Modernized, with enhanced or added material

Sample Elective Courses (at least 11 credits as approved by student's PhD Examination Committee)

Under Semesters			Under Quarters		
Code	Credits	Title	Code	Credits	Notes
PUBHBIO 7220	3	Applied Logistic Regression	PUBHBIO 606	4	Modernized, with enhanced or added material
PUBHBIO 7225 / STAT 6510	3	Survey Sampling Methods	PUBHBIO 651 / STAT 651	4	Modernized, with enhanced or added material
PUBHBIO 7240 / STAT 6520	3	Applied Statistical Analysis with Missing Data	PUBHBIO 652 / STAT 652	4	Modernized, with enhanced or added material
STAT 6550	2	Statistical Analysis of Time Series	STAT 635	3	Straight conversion
STAT 6620	2	Environmental Statistics	STAT 662	3	Straight conversion
STAT 6650	2	Discrete Data Analysis	STAT 665	4	Re-envisioned as a two semester hour required course for MAS degree - material was removed
STAT 7450	3	Multiple Comparisons Procedures	STAT 745	3	Modernized, with enhanced or added material

The doctoral program requires a minimum of 80 semester credits including the 4 credit hours of math prerequisite and the 60 credit hours of courses described in the core and elective courses above.

Proposed Ph.D. in Biostatistics - Public Health Specialization
List of Semester courses

Math prerequisite (or equivalent)

Under Semesters			Under Quarters		Notes
Code	Credits	Title	Code	Credits	
The Public Health track of the Biostatistics PhD program presupposes a mathematical background that includes linear algebra (including matrices; e.g. Math 2568.XX (4)) and calculus (Math 2153.XX (4) and pre-requisites Math 1151 (5) and Math 1152 (5))					no change to prereq

Core Required Courses (44 credits)

Under Semesters			Under Quarters		Notes
Code	Credits	Title	Code	Credits	
PUBHBIO 7245 / STAT 7755	2	Biostatistical Collaboration	PUBHBIO 786 / BIOSTAT 709	3	straight conversion (name change, cross-list added)
PUBHBIO 8230 / STAT 7470	3	Advanced Longitudinal Data Analysis	PUBHBIO 726 / STAT 726	4	Modernized, with enhanced or added material
PUBHBIO 8235	3	Advanced Regression Modeling of Time-to-Event Data	PUBHBIO 706	4	Modernized, with enhanced or added material
PUBHEPI 6430.01	3	Epidemiology I	PUBHEPI 710	4	Modernized, with enhanced or added material
PUBHEPI 6430.02	1	Epidemiology I Lab			New course
STAT 6540	3	Applied Stochastic Processes	STAT 632	3	Material added to modernize the course. It is now required in one track of Biostatistics PhD
STAT 6615	2	Design and Analysis of Clinical Trials	BIOSTAT 615	3	Straight conversion
STAT 6801	4	Statistical Theory I	STAT 620/621	4 + half of 4	Straight conversion of sequence
STAT 6802	4	Statistical Theory II	STAT 621/622	half of 4 + 4	Straight conversion of sequence
STAT 6860	2	Foundations of the Linear Model			New course
STAT 6910	4	Applied Statistics I	STAT 641	5	Modernized, with enhanced or added material
STAT 6950	4	Applied Statistics II	STAT 645	5	Modernized, with enhanced or added material
STAT 7410	3	Theory of the Linear Model	STAT 742	3	Modernized, with enhanced or added material
STAT 7430	3	Generalized Linear Models	STAT 743	3	Modernized, with enhanced or added material
STAT 7730	3	Advanced Computational Statistics	STAT 773	3	Modernized, with enhanced or added material

Sample Elective Courses (at least 12 credits as approved by student's PhD Examination Committee)

Code	Under Semesters		Under Quarters		
	Credits	Title	Code	Credits	Notes
PUBHBIO 7220	3	Applied Logistic Regression	PUBHBIO 606	4	Modernized, with enhanced or added material
PUBHBIO 7225 / STAT 6510	3	Survey Sampling Methods	PUBHBIO 651/STAT 651	4	Modernized, with enhanced or added material
PUBHBIO 7240 / STAT 6520	3	Applied Statistical Analysis with Missing Data	PUBHBIO 652/STAT 652	4	Modernized, with enhanced or added material
STAT 6550	2	Statistical Analysis of Time Series	STAT 635	3	Straight conversion
STAT 6620	2	Environmental Statistics	STAT 662	3	Straight conversion
STAT 6625	3	Statistical Analysis in Genetic Epidemiology			New course
STAT 6650	2	Discrete Data Analysis	STAT 665	4	Re-envisioned as a two semester hour required course for MAS degree - material was removed
STAT 7450	3	Multiple Comparisons Procedures	STAT 745	3	Modernized, with enhanced or added material
STAT 8625	3	Stat Methods for Analyzing Genetic Data	STAT 833	3	Modernized, with enhanced or added material

Sample Cognate Courses (at least 6 credits outside of STAT/PUBHBIO)

Code	Under Semesters		Under Quarters		
	Credits	Title	Code	Credits	Notes
PUBHEHS 6310	3	Principles of Environmental Health Science	PUBHEHS 731	4	Modernized, with enhanced or added material
PUBHEPI 6411	3	Biological Basis of Public Health	PUBHEPI 704	4	Modernized, with enhanced or added material
PUBHEPI 8412	3	Design and Analysis of Group Randomized Trials	PUBHEPI 821	4	Modernized, with enhanced or added material
PUBHEPI 7410	3	Epidemiology II	PUBHEPI 711	4	Modernized, with enhanced or added material
PUBHHBP 6510	3	Preventing disease and promoting health through behavioral science	PUBHHBP 720	4	Modernized, with enhanced or added material

The doctoral program requires a minimum of 80 semester credits including the 62 credits hours of courses described in the core, elective, and cognate groups of courses listed above.

PLAN OF STUDY

PHD IN Biostatistics with a Methodology Specialization

This form should be submitted to the Graduate Studies Committee within two semesters following the passing of Qualifier Exam II and before the Candidacy Exam. Indicate your grade in the following required courses or when you plan to take them. Use a W to indicate a waived course.

Name: _____ Date: _____

Core Course Requirements: (53 semester credits)

PUBHBIO 7245 _____	PUBHBIO 8230 _____	PUBHBIO 8235 (3) _____
/ STAT 7755 (2) _____	/ STAT 7470 (3) _____	
STAT 6615 (2) _____	STAT 6801 (4) _____	STAT 6802 (4) _____
STAT 6860 (2) _____	STAT 6910 (4) _____	STAT 6950 (4) _____
STAT 7201 (3) _____	STAT 7301 (3) _____	STAT 7302 (3) _____
STAT 7410 (3) _____	STAT 7540(3) _____	STAT 7730 (3) _____
STAT 8625 (3) _____	MATH 4545 (4) _____	

Electives: (at least 11 semester credits): As approved by the student's PhD Examination Committee, generally chosen from courses at the 7000+ level in PUBHBIO or 6000+ level in STAT.

<u>Elective</u>	<u>Credit Hours</u>	<u>Grade or Semester Planned</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
Total Hours:	_____	

Projected Date of Ph.D. Candidacy Examination: _____

Having met on _____, the undersigned approve the listed program and agree to serve on the Ph.D. Candidacy Examination Committee.

_____ Student's Signature	_____ Examination Committee Chairperson _____ Examination Committee Member _____ Examination Committee Member _____ Examination Committee Member
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Approved by: _____ Date: _____
Graduate Studies Committee Chairperson

PLAN OF STUDY

PHD IN Biostatistics with a Public Health Specialization

This form should be submitted to the Graduate Studies Committee within two semesters following the passing of Qualifier Exam II and before the Candidacy Exam. Indicate your grade in the following required courses or when you plan to take them. Use a W to indicate a waived course.

Name: _____ Date: _____

Core Course Requirements: (44 semester credits)

PUBHBIO 7245 / STAT 7755 (2) _____	PUBHBIO 8230 / STAT 7470 (3) _____	PUBHBIO 8235 (3) _____
PUBHEPI 6430.01 (3) _____	PUBHEPI 6430.02 (1) _____	STAT 6540 (3) _____
STAT 6615 (2) _____	STAT 6801 (4) _____	STAT 6802 (4) _____
STAT 6860 (2) _____	STAT 6910 (4) _____	STAT 6950 (4) _____
STAT 7410 (3) _____	STAT 7730 (3) _____	STAT 7430 (3) _____

Cognate: (6 semester credits): Coursework outside of statistics / biostatistics, in a health-related field, as approved by the student's PhD Examination Committee.

<u>Cognate Area Course</u>	<u>Credit Hours</u>	<u>Grade or Semester Planned</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
Total Hours:	_____	

Electives: (at least 12 semester credits): As approved by the student's PhD Examination Committee, generally chosen from courses at the 7000+ level in PUBHBIO or 6000+ level in STAT.

<u>Elective</u>	<u>Credit Hours</u>	<u>Grade or Semester Planned</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
Total Hours:	_____	

Projected Date of Ph.D. Candidacy Examination: _____

Having met on _____, the undersigned approve the listed program and agree to serve on the Ph.D. Candidacy Examination Committee.

Student's Signature

Examination Committee Chairperson

Examination Committee Member

Examination Committee Member

Examination Committee Member

Approved by: _____
Graduate Studies Committee Chairperson

Date: _____

**PH.D. IN BIOSTATISTICS PLAN OF STUDY
THEORY/METHODOLOGIC TRACK**

This form should be submitted to the Graduate Studies Committee within four quarters following the passing of Qualifier Exam II and before the Candidacy Exam. Indicate your grade in the following required courses or when you plan to take them. Use a W to indicate a waived course.

Name: _____ Date: _____

Core Course Requirements:

Statistics 620(4) _____ 621(4) _____ 622(4) _____ 641(5) _____
645(5) _____ 722(4) _____ 723(4) _____ 742(3) _____
743 _____ 820(3) _____ 821(3) _____ 832(3) _____

Biostatistics 615(3) _____ PH-Bio 706(4) _____
PH-Bio 726(3) _____ Stat 833(3) _____

Consulting Biostat 709(2-3) _____ or Pub Hlth _____
786(3)

Electives (22 hours required): As approved by the student's Ph.D. Examination Committee, elective courses are generally at the 700 level and above in Statistics, Biostatistics, or Public Health with an additional course at the 500 level or above in a biomedical scientific area of application

<u>Elective</u>	<u>Credit Hours</u>	<u>Grade or Quarter Planned</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
Total Hours:	_____	

Projected Date of Ph.D. Candidacy Examination: _____

Having met on _____, the undersigned approve the listed program and agree to serve on the Ph.D. Candidacy Examination Committee.

Student's Signature

Examination Committee Chairperson

Examination Committee Member

Examination Committee Member

Examination Committee Member

Approved by: _____
Graduate Studies Committee Chairperson

Date: _____

**PH.D. IN BIOSTATISTICS PLAN OF STUDY
APPLIED/METHODOLOGIC TRACK**

This form should be submitted to the Graduate Studies Committee within four quarters following the passing of Qualifier Exam II and before the Candidacy Exam. Indicate your grade in the following required courses or when you plan to take them. Use a W to indicate a waived course.

Name: _____ Date: _____

Core Course Requirements:

Statistics 620(4) _____ 621(4) _____ 622(4) _____ 641(5) _____
645(5) _____ 743(3) _____ 773(3) _____

Biostatistics Biostat 605(3) _____ Biostat 615(3) _____ STAT 651 (4) _____
PH-Bio 606(4) _____ PH-Bio 652/ _____ PH-Bio 701(4) _____
STAT 652(4) _____
PH-Bio 702(4) _____ PH-Bio 703(4) _____ PH-Bio 706(4) _____
PH-Bio 726(3) _____ Stat 833(4) _____ PH-Epi 710(4) _____

Consulting PH-Bio 786(3) _____

Electives (13 hours required): As approved by the student's Ph.D. Examination Committee, elective courses are generally at the 700 level and above in Statistics, Biostatistics, or Public Health with an additional course at the 500 level or above in a biomedical scientific area of application

<u>Elective</u>	<u>Credit Hours</u>	<u>Grade or Quarter Planned</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
Total Hours:	_____	

Projected Date of Ph.D. Candidacy Examination: _____

Having met on _____, the undersigned approve the listed program and agree to serve on the Ph.D. Candidacy Examination Committee.

Student's Signature

Examination Committee Chairperson

Examination Committee Member

Examination Committee Member

Examination Committee Member

Approved by: _____
Graduate Studies Committee Chairperson

Date: _____

Proposed PhD in Biostatistics Transition Policy

Students who began their degree under quarters will not be penalized as the university moves to semesters, either in terms of progress towards their degree or their expected timing of graduation. The Graduate Studies Chair is the advisor for all PhD students upon entry to the program. Students are also assigned a faculty mentor with whom they meet every quarter. This level of support will continue under semesters: Each student will meet with a faculty mentor every semester. When a student selects an advisor for dissertation work (typically during year three of the program), this advisor will replace the assigned faculty mentor.

Requirements for the quarter-based Biostatistics PhD degree include a one-year sequence on Statistical Theory (Stat 620-621-622). The Statistical Theory sequence is a straight conversion of the quarter-based sequence. If a student already has credit for Stat 620, but not for Stat 621, then the student will have the option of taking a two-hour reading course (Stat 6193 or Stat 6194) to complete the equivalent of Stat 6801; if a student already has credit for Stat 620 and Stat 621, but not Stat 622, the student will take Stat 6802.

Students will be held to the requirements of the program in the year they matriculated; i.e., students entering under quarters will follow the quarter-based PhD curriculum, with the option to elect the semester-based curriculum. In particular, for the Methodology specialization, students entering under quarters will not be required to take STAT 7730 (Advanced Statistical Computing) or STAT 6860 (Foundations of the Linear Model), though taking these courses as electives will be encouraged. Methodology specialization students typically take the probability sequence Stat 722-723 during a single academic year. However, if a student already has credit for Stat 722, but not for Stat 723, then the student will have the option of taking a two-hour reading course (Stat 8193 or Stat 8194) to complete the equivalent of the sequence. Students entering under quarters who do not start the sequence until semesters will take only Stat 7201. For students in the Public Health specialization, those entering under quarters will not be required to take STAT 6540 (Applied Stochastic Processes), STAT 6860 (Foundations of the Linear Model), or PUBHEPI 6430.02 (Lab for Epidemiology I), though taking these courses as electives will be encouraged. For the Public Health specialization, the semester-based PhD has a requirement of 6 credits in a cognate area that will be waived for students

who matriculate under quarters.

The content of qualifying examinations from 2012 through 2014 will be adjusted to match the content of coursework taken by those who began the program under quarters.

Courses will be matched on the one-for-one basis below, with the exception of the statistical theory sequence (Stat 620-621-622) and the probability sequence (Stat 722-723), discussed above.

Quarter Course	Quarter Credits	Semester Course	Semester Credits
BIOSTAT 615	3	STAT 6615	2
BIOSTAT 709	2	PUBHBIO 7245 / STAT 7755	2
PUBHBIO 606	4	PUBHBIO 7220	3
PUBHBIO 701	4	PUBHBIO 6210	3
PUBHBIO 702	4	PUBHBIO 6211	3
PUBHBIO 703	4	PUBHBIO 6212	3
PUBHBIO 706	4	PUBHBIO 8235	3
PUBHBIO 786	3	PUBHBIO 7245 / STAT 7755	2
PUBHBIO/BIOSTAT 605	4	PUBHBIO 7235 / STAT 6605	3
PUBHBIO/STAT 651	4	PUBHBIO 7225 / STAT 6510	3
PUBHBIO/STAT 652	4	PUBHBIO 7240 / STAT 6520	3
PUBHBIO/STAT 726	4	PUBHBIO 8230 / STAT 7470	3
PUBHEPI 710	4	PUBHEPI 6410 or 6430.01	3
STAT 620-621-622	3+3+3	STAT 6801-6802	4+4
STAT 641	5	STAT 6910	4
STAT 645	5	STAT 6950	4
STAT 722-723	4+4	STAT 7201	4
STAT 742	4	STAT 7410	3
STAT 743	3	STAT 7430	3
STAT 773	3	STAT 7730	3
STAT 822	3	STAT 7301	3
STAT 821	3	STAT 7302	3
STAT 832	3	STAT 7540	3
STAT 833	3	STAT 8625	3

Examples of transition:

Methodology Specialization

Student entering in Autumn 2010:

	Au	Wi	Sp
Year 1 (Quarters) 2010 – 2011	Stat 620 (4) Stat 645 (5)	Stat 621 (4) Stat 641 (5)	Stat 622 (4) Elective (5)
Year 2 (Quarters) 2011 – 2012	Stat 722 (4) Stat 742 (4) Stat 820 (3)	Stat 723 (4) Stat 743 (3) Stat 821 (3) Biostat 709 (2)	Stat 832 (3) Elective (3) Elective (4)
Year 3 (Semesters) 2012 – 2013	Stat 8625 (3) Stat 6615 (2) Elective (3)		Pubhbio 8235 (3) Pubhbio 8230 / Stat 7470 (3) Elective (2)

Student entering in Autumn 2011:

	Au	Wi	Sp
Year 1 (Quarters) 2011 – 2012	Stat 620 (4) Stat 645 (5)	Stat 621 (4) Stat 641 (5)	Stat 622 (4) Elective (5)
Year 2 (Semesters) 2012 – 2013	Stat 7201 (3) Stat 7410 (3) Stat 7301 (3)		Stat 7540 (3) Stat 7302 (3) Elective (3)
Year 3 (Semesters) 2013 – 2014	Stat 8625 (3) Stat 6615 (2) Stat 7430 (3) Elective (2)		Pubhbio 8235 (3) Pubhbio 8230 / Stat 7470 (3) Pubhbio 7245 / Stat 7755 (2) Elective (2)

Public Health Specialization

Student entering in Autumn 2010:

	Au	Wi	Sp
Year 1 (Quarters) 2010 – 2011	Stat 620 (4) Stat 645 (5) Pubhbio 701 (4)	Stat 621 (4) Stat 641 (5) Pubhbio 702 (4)	Stat 622 (4) Pubhbio 703 (4)
Year 2 (Quarters) 2011 – 2012	Stat 773 (3) Pubhbio/Stat 652 (4) Pubhepi 710 (4)	Stat 743 (3) Pubhbio 606 (4) Pubhbio/Biostat 605 (4)	Pubhbio 786 (3) Elective (4) Elective (3)
Year 3 (Semesters) 2012 – 2013	Stat 8625 (3) Stat 6615 (2) Pubhbio 7225 / Stat 6510 (3)		Pubhbio 8235 (3) Pubhbio 8230 / Stat 7470 (3) Elective (2)

Student entering in Autumn 2011:

	Au	Wi	Sp
Year 1 (Quarters) 2011 – 2012	Stat 620 (4) Stat 645 (5) Pubhbio 701 (4)	Stat 621 (4) Stat 641 (5) Pubhbio 702 (4)	Stat 622 (4) Pubhbio 703 (4) Elective (2)
Year 2 (Semesters) 2012 – 2013	Stat 7730 (3) Pubhbio 7240 / Stat 6520 (3) Pubhbio 7225 / Stat 6510 (3) Pubhepi 6410 (3)		Pubhbio 7235 / Stat 6605 (3) Pubhbio 7220 (3) Elective (2)
Year 3 (Semesters) 2013 – 2014	Stat 8625 (3) Stat 6615 (2) Stat 7430 (3)		Pubhbio 8235 (3) Pubhbio 8230 / Stat 7470 (3) Pubhbio 7245 / Stat 7755 (2)

PH.D. IN BIOSTATISTICS (METHODOLOGY SPECIALIZATION)

(effective Summer 2012)

The basic philosophy of the Ph.D. program in biostatistics is to provide trained personnel not only to the academic profession, but also to industry and government. The goal is to develop a student's ability to create new methodologies as well as to address applied questions that arise in the biomedical sciences. Although programs are individually designed to suit the needs of particular students, there is a core curriculum that every student follows. This core curriculum includes courses in theoretical and applied statistics and biostatistics including Statistical Genetics and Survival Analysis.

Students in the Biostatistics PhD degree program who choose the Methodology Specialization will be assigned faculty advisers in the Department of Statistics after they declare their specialization preference following their successful passing of the QI examination. This document serves as a resource to be used by the student and the adviser in planning the program of study for the Methodology specialization.

Note: The Methodology Specialization of the Biostatistics Ph.D. program presupposes a mathematical background that includes linear algebra and advanced calculus.

Course Requirements – Methodology Specialization

<u>Mathematics</u> (4 hours)	MATH 4545 (4)	Tentative title: "Survey of topics in analysis"
<u>Core Statistics</u> (37 hours)	6801 (4), 6802 (4) 6910 (4), 6950 (4) 7201 (3) 6860 (2) 7540 (3) 7730 (3) 7301 (3), 7302 (3) 7410 (3) 8625 (3)	Statistical Theory I & II Applied Statistics I & II Theory of Probability Foundations of the Linear Model Theory of Stochastic Processes Advanced Computational Statistics Advanced Statistical Theory I & II Theory of the Linear Model Statistical Methods for Analyzing Genetic Data
<u>Core Biostatistics</u> (8 hours)	PUBHBIO 7215 / STAT 6615 (2) PUBHBIO 8230 / STAT 7470 (3) PUBHBIO 8235 (3)	Design and Analysis of Clinical Trials Advanced Longitudinal Data Analysis Advanced Regression Modeling of Time-to-Event Data
<u>Consulting</u> (2 hours)	PUBHBIO 7245 / STAT 7755 (2)	Biostatistical Collaboration

Electives
(11 Credits) As approved by the student's PhD Examination Committee (generally chosen from courses at the 7000-level and above in PUBHBIO or 6000-level and above in STAT).

TOTAL COURSE HOUR REQUIREMENTS: The doctoral program requires a minimum of 80 semester credits including the 64 credits hours of courses described in the five groups of courses listed above. A grade of B- or better is required in all courses in the Ph.D. program.

Typical Program (first three years)

	<u>Autumn</u>	<u>Spring</u>	<u>May</u>	<u>Summer</u>
<u>First Year</u>	STAT 6801 (4) STAT 6910 (4) MATH 4545 (4)	STAT 6802 (4) STAT 6950 (4) STAT 6860 (2) PUBHBIO 7215 (2) / STAT 6615 (2)		
<u>Second Year</u>	STAT 7410 (3) STAT 7301 (3) STAT 7201 (3)	STAT 7540 (3) STAT 7302 (3) PUBHBIO 8230 (3) / STAT 7470 (3)		
<u>Third Year</u>	STAT 8625 (3) PUBHBIO 8235 (3) STAT 7730 (3)	Elective Elective Elective		

Examinations: Two qualifying examinations must be passed prior to the student forming his/her PhD Examination Committee. Qualifier I covers the first year courses and Qualifier II covers the 2nd year courses. Qualifier I is a six-hour closed-book examination given at the end of the May term following completion of the first year of study and, if not passed, may be retaken just prior to the Autumn Semester. Qualifier II is a six hour closed book exam that covers the 1st and 2nd year courses.

Students must declare their choice of specialization, Public Health or Methodology, within one semester after passing the QI examination. Note that neither specialization should be considered as an alternative once the other track has resulted in failure.

The student is required to file a Plan of Study form with the approval of his/her PhD Examination Committee within two semesters after passing Qualifier II. This examination structure is identical to that for the Ph.D. degree in Statistics (see section entitled "Ph.D. in Statistics").

DRAFT

Guide for the Public Health Specialization of the Biostatistics PhD Degree Program

The basic philosophy of the PhD program in biostatistics is to provide trained personnel not only to the academic profession, but also to industry and government. The goal is to develop a student's ability to create new methodologies as well as to address applied questions that arise in the biomedical sciences. Although programs are individually designed to suit the needs of particular students, there is a core curriculum that every student follows. This core curriculum includes courses in theoretical and applied statistics, as well as required coursework in a biological area such as genetics, medicine, or physiology.

Students in the Biostatistics PhD degree program who choose the Public Health Specialization will be assigned faculty advisers in the College Public Health after they declare their specialization preference during their second year. This document serves as a resource to be used by the student and the adviser in planning the program of study for the Public Health specialization. For additional information about PhD requirements, students are directed to the College of Public Health (CPH) *Student Handbook* (available online at <http://cph.osu.edu/academics/handbooks.cfm/>) and to the *Graduate School Handbook* (available online at <http://www.gradsch.ohio-state.edu/>).

The Public Health specialization of the Biostatistics PhD program presupposes a mathematical background that includes linear algebra (including matrices) and advanced calculus.

PROGRAM OF STUDY

Required Courses (44 semester credits)
A grade of B- or better is required.

PUBHBIO/STAT Courses (40 semester credits)

PUBHBIO 7245	Biostatistical Collaboration	2 cr
/ STAT 7755		
PUBHBIO 8230	Advanced Longitudinal Data Analysis	3 cr
/ STAT 7470		
PUBHBIO 8235	Advanced Regr Modeling of Time-to-Event Data	3 cr
STAT 6801	Statistical Theory I	4 cr
STAT 6802	Statistical Theory II	4 cr
STAT 6540	Applied Stochastic Processes	3 cr
OR STAT 7540	<i>Theory of Stochastic Processes</i>	
STAT 6615	Design & Analysis of Clinical Trials	2 cr
STAT 6910	Applied Statistics I	4 cr
STAT 6950	Applied Statistics II	4 cr
STAT 7410	Theory of the Linear Model	3 cr
STAT 7430	Generalized Linear Models	3 cr
STAT 7730	Advanced Computational Statistics	3 cr
STAT 6860	Foundations of the Linear Model	2 cr

EPI Course (4 semester credits)

PUBHEPI 6430.01	Epidemiology I	3 cr
PUBHEPI 6430.02	Epidemiology I Lab	1 cr

Cognate Courses (6 semester credits)

At least 6 semester credits outside of statistics/ biostatistics, in a health-related field, as approved by the student's PhD Examination Committee.

Electives (at least 12 semester credits)

As approved by the student's PhD Examination Committee (generally chosen from courses at the 7000-level and above in PUBHBIO or 6000-level and above in STAT). A grade of B- or better is required.

Suggested Electives

CPH Courses

PUBHBIO 7220	Applied Logistic Regression	3 cr
PUBHBIO 7225/		
STAT 651	Survey Sampling Methods	3 cr
PUBHBIO 7240/		
STAT 652	Applied Stat Analysis w/Missing Data	3 cr

STAT Courses

STAT 6550	Stat Analysis of Time Series	2 cr
STAT 6620	Environmental Statistics	2 cr
STAT 6625	Stat Methods for Analyzing Genetic Data	3 cr
STAT 6650	Discrete Data Analysis	2 cr
STAT 7450	Multiple Comparisons Procedures	3 cr

Summer Program

Maximum of 3 semester credits

Note: Students in the Biostatistics PhD program are given the same priority as students in the Statistics PhD program when registering for STAT classes.

REQUIRED HOURS

The doctoral program requires a minimum of 80 semester credits or 50 semester credits beyond a master's degree. A maximum of 30 semester credits of master's degree work may be applied to PhD requirements if approved by the faculty adviser.

QUALIFIER I EXAM

Qualifier I is a six-hour closed-book examination given at the end of the May term following completion of the first year of study and, if not passed, may be retaken just prior to the Autumn Semester.

QUALIFIER II EXAM

After passing Qualifier I, the student should elect to follow either the Methodology or the Public Health specialization. Those who declare the Public Health specialization are required to take a four-hour closed book in-class examination and complete a one-day (eight-hour) open book data analysis project in one of the CPH computer labs. The in-class exam covers material presented in the first and second year required courses, with an emphasis on Biostatistics applications. The student should pass this exam in his/her third year.

PhD EXAMINATION COMMITTEE

After passing the Qualifier II, the student chooses a dissertation adviser, who must be a Category P Biostatistics graduate faculty member. After a dissertation adviser is chosen, the student also forms a PhD Examination Committee, consisting of at least four graduate faculty members from the CPH Division of Biostatistics, the Department of Statistics, or other departments consistent with the student's interests. This committee is responsible for approving a Plan of Study to be filed with the Graduate Studies Committee within two semesters after passing Qualifier II.

CANDIDACY EXAMINATION

After completion of all required courses (as specified by the student's PhD Examination Committee), the candidate's PhD Examination Committee will administer and grade a PhD Candidacy Examination. Specific details are available in Appendix G of the *CPH Student Handbook* online at <http://cph.osu.edu/academics/handbooks.cfm/>.

FINAL ORAL EXAMINATION/DISSERTATION PHASE

After passing the Candidacy Exam, the student forms a Dissertation Committee. The student should meet with the committee at least twice a year to report the progress. Once the student has made sufficient progress (as judged by the Dissertation Committee) on his/her dissertation to warrant holding the Final Oral Examination, the Doctoral Draft Approval/Notification of Final Oral Examination form must be filed with the Graduate School at least two weeks prior to the actual Final Oral Examination/Dissertation Defense. The Dissertation Committee then conducts a two-hour oral examination in which the candidate discusses/defends his/her dissertation.

Students must pass the Final Oral Examination and submit a final, approved copy of the dissertation to the Graduate School within five years of being admitted to candidacy. For more information about the dissertation and the Final Oral Examination, see Section 8.5 of the *CPH Graduate Student Handbook* and Section II.6 of the *Graduate School Handbook*. Detailed instructions for the dissertation are available on the Graduate Schools web site at <http://www.gradsch.ohio-state.edu>.

ACADEMIC STANDARDS

To remain in good academic standing, graduate students must maintain a minimum 3.0 overall GPA. In addition, a B- or higher must be earned in the required courses. For more details, see Section 11.2 of the *CPH Student Handbook*.

GRADUATION

Students must be enrolled for a minimum of three graduate credits during the semester of graduation. An "Application to Graduate" form (available on the Graduate School's Web site) must be completed by the student, signed by the faculty adviser, and returned to the Office of Academic Programs (OAP) for processing. The deadline for submitting the signed form to OAP is the first Friday of the semester of graduation. Prior to end of the last semester of enrollment, students also are asked to complete an Exit Survey, as explained in Section 13.14 of the *CPH Student Handbook*.

OFFICE OF ACADEMIC PROGRAMS

Counselors are available in the Office of Academic Programs in Cunz Hall (614-293-3907) to provide assistance regarding College of Public Health or University processes and procedures. Questions regarding the student's course work or research should be directed to the faculty adviser.

Typical Program (first three years)

	<u>Autumn</u>	<u>Spring</u>	<u>May</u>	<u>Summer</u>
<u>First Year</u>	STAT 6801 (4) STAT 6910 (4) PUBHEPI 6430.1 (3) PUBHEPI 6430.2 (1)	STAT 6802 (4) STAT 6950 (4) STAT 6860 (2) PUBHBIO 7215 (2) / STAT 6615 (2)		
<u>Second Year</u>	STAT 7410 (3) STAT 6540 (3) PUBHBIO 8235 (3)	STAT 7430 (3) PUBHBIO 8230 (3) / STAT 7470 (3) Elective		
<u>Third Year</u>	STAT 7730 (3) Elective Cognate	Elective Elective Cognate		

PH.D. IN BIostatISTICS (THEORY/METHODOLOGIC TRACK)

(as of June 2010)

Please note that the course requirements for the two-track program have not been finalized. The final course requirements will likely be very close to these, but be aware that some changes may be made. The final course requirements will be posted on the department website (www.stat.osu.edu) as soon as they are available. If you have any questions or concerns about your course schedule, please see your advisor or the Graduate Studies Committee Chair.

The basic philosophy of the Ph.D. program in biostatistics is to provide trained personnel not only to the academic profession, but also to industry and government. The goal is to develop a student's ability to create new methodologies as well as to address applied questions that arise in the biomedical sciences. Although programs are individually designed to suit the needs of particular students, there is a core curriculum that every student follows. This core curriculum includes courses in theoretical and applied statistics, as well as required coursework in a biological area such as genetics, medicine, or physiology.

Note: The Ph.D. program in biostatistics (theory/methodologic track) presupposes a mathematical background that includes linear algebra and advanced calculus.

Course Requirements – Theory/Methodologic Track

Mathematics

As required for individual students to reach the mathematical maturity necessary to be successful in the Statistics courses 722, 723, 820, 821, and 832. Minimum requirements should be the equivalents of Math 547(4), 548(4), and 549(4)

Core Statistics (46 hours)

620, 621, 622
(4 each)

Statistical Theory I, II, & III

641(5)
645(5)

Design and Analysis of Experiments
Applied Regression Analysis

722(4), 723(4)

Theory of Probability I & II

742(4)
743 (3)

Analysis of Variance
Generalized Linear Models

820(3), 821(3)

Statistical Inference I & II

832(3)

Applied Probability Models

<u>Core Biostatistics</u> (14 hours)	Biostat 615(3) PH-Bio 706(4) PH-Bio 726(4) Stat 833(3)	Design and Analysis of Clinical Trials Regression Modeling of Time-to-Event Data Longitudinal Data Analysis Statistical Methods for Analyzing Genetic Data
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<u>Consulting</u> (2 hours)	709(2)	Biostat 709 [or PH-Bio 786(3)]
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<u>Electives</u> (22 Hours)	An additional 22 hours as approved by a student's Ph.D. Examination Committee (generally chosen from courses at the 700-level and above in Statistics, Biostatistics, or Public Health and a course at the 500-level or above in a biomedical scientific area of application)
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TOTAL COURSE HOUR REQUIREMENTS: 84 hours plus any necessary mathematics

A grade of B- or better is required in all courses in the Ph.D. program.

Typical Program (first three years)

First Year

Summer	Autumn	Winter	Spring
602	620	621	622
603	645	641	Elective
Elective	Math 547	Math 548	Math 549

Second Year

Currently under revision

Third Year

Currently under revision

*Offered every other year

Note: Enrollment in Summer Quarter of the first year is optional, but encouraged.

Examinations: The examination structure is identical to that for the Ph.D. degree in statistics (see section entitled "Ph.D. in Statistics"). The student is required to file the Plan of Study form with the approval of his/her Examination Committee within four quarters after passing Qualifier II.

Students must declare their choice of track, Applied/Methodologic or Theory/Methodologic, within a quarter after passing the QI examination. Note that neither track should be considered as an alternative once the other track has resulted in failure.

PH.D. IN BIostatISTICS (APPLIED/METHODOLOGIC TRACK)

(as of June 2010)

Please note that the course requirements for the two-track program have not been finalized. The final course requirements will likely be very close to these, but be aware that some changes may be made. The final course requirements will be posted on department website (www.stat.osu.edu) as soon as they are available. If you have any questions or concerns about your course schedule, please see your advisor or the Graduate Studies Committee Chair.

Course Requirements – Applied/Methodologic Track

<u>Mathematics</u>		The applied track presupposes a mathematical background that includes linear algebra (including matrices) and advanced calculus.
<u>Core Statistics</u> (28 hours)	620, 621, 622 (4 each)	Statistical Theory I, II, & III
	641(5) 645(5)	Design and Analysis of Experiments Applied Regression Analysis
	743(3) 773(3)	Generalized Linear Models Statistical Computing
<u>Core Biostatistics</u> <u>and Public Health</u> (46 hours)	Biostat 605(4) Biostat 615(3) Stat 651(4)	Applied Survival Analysis I Design and Analysis of Clinical Trials Survey Sampling Methods
	PH-Bio 606(4) PH-Bio 726(4) PH-Bio 652(4) PH-Bio 701(4) PH-Bio 702(4) PH-Bio 703(4) PH-Bio 706(4)	Applied Logistic Regression Longitudinal Data Analysis Applied Statistical Analysis with Missing Data Design and Analysis of Studies in the Hlth Sci I Design and Analysis of Studies in the Hlth Sci II A Problem-Oriented Approach to Biostatistics Regression Modeling of Time-to-Event Data
	Stat 833 (3)	Statistical Methods for Analyzing Genetic Data
	PH-Epi 710(4)	Principles of Epidemiology
<u>Consulting</u> (3 hours)	PH-Bio 786(3)	Biostatistics Consulting Laboratory

Electives
(13 Hours)

An additional 13 hours as approved by a student's Ph.D. Examination Committee (generally chosen from courses at the 700-level and above in Statistics, Biostatistics, or Public Health and a course at the 500-level or above in a biomedical scientific area of application)

TOTAL COURSE HOUR REQUIREMENTS: 90 hours plus any necessary mathematics

A grade of B- or better is required in all courses in the Ph.D. program.

First Year (Partial Class List for Typical Program)

First Year

Summer	Autumn	Winter	Spring
602	620	621	622
603	645	641	

Second Year

Currently under revision

Third Year

Currently under revision

Note: Enrollment in Summer Quarter of the first year is optional, but encouraged.

Examinations: Students in the Applied/Methodologic Track are required to pass the same QI examination as for the Ph.D. degree in statistics (see section entitled "Ph.D. in Statistics"). Their QII examination, however, will have a different structure. Students must declare their choice of track, Applied/Methodologic or Theory/Methodologic, within a quarter after passing the QI examination. Note that neither track should be considered as an alternative once the other track has resulted in failure.