STUDENT HANDBOOK

Department of Bioinformatics and Biostatistics

UNIVERSITY OF LOUISVILLE
SCHOOL OF PUBLIC HEALTH AND INFORMATION SCIENCES

2018-2019

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I. FROM THE DEPARTMENT OF BIOINFORMATICS AND BIOSTATISTICS

From the Department Chair

Dear Student:

This handbook has been prepared to acquaint you with the Department of Bioinformatics and Biostatistics at the University of Louisville. It contains policies and procedures and important information you need to know in order to be a successful student.

This publication is meant to be a supplement to the *University of Louisville Graduate School Catalog*. There may be policy or curriculum changes in the handbook that differ from those in the Catalog. In these cases, the Handbook supersedes information in the Catalog. However, all policies and procedures of the Graduate School must be adhered to by all graduate students in the Department of Bioinformatics and Biostatistics. Additional information and University student policies are printed in the *University of Louisville Student Handbook* and the University of Louisville schedule of courses, and are available on the University of Louisville website.

It is the student's responsibility to read the Catalog, student handbooks, and official notices to be informed about grades, credits, requirements, and to abide by the regulations of the University of Louisville, the School of Public Health and Information Sciences, and the Department of Bioinformatics and Biostatistics.

K.B. Kulasekera, Ph.D.
Professor and Chair
Department of Bioinformatics and Biostatistics
School of Public Health and Information Sciences
University of Louisville
485 E. Gray Street
Louisville, KY 40202
(502) 852-1827
(502) 852-3294 (FAX)

Mission Statement

The Department of Bioinformatics and Biostatistics is dedicated to the proper application of research methods in Bioinformatics and Biostatistics and to the training of professionals in each of these areas. This mission consists of three interrelated parts: Education, Research, and Service.

Education

To train professionals in the theory and practice of Bioinformatics and Biostatistics so that they can contribute statistical and analytical expertise within academic settings, industry, government agencies, and healthcare organizations.

Research

To advance the disciplines of Bioinformatics and Biostatistics by conducting primary methodological research in these areas and by collaborating with members of the research community at UofL.

Service

To provide consulting services in Bioinformatics and Biostatistics to the research community and the UofL Health Sciences Center.

Department of Bioinformatics and Biostatistics Web Page

http://louisville.edu/sphis/departments/bioinformatics-biostatistics

Contacting Faculty or Staff

1. Telephone Messages: You may leave a message for a faculty or staff member with the Department of Bioinformatics and Biostatistics administrative assistant (852-1827) or you may leave a voice mail message with individual faculty/staff members at their respective phone extensions.
2. E-Mail: All faculty and staff have e-mail accounts and you may communicate with them via e-mail.
3. Faculty-Staff Mailboxes: Written messages or materials for faculty/staff may be given to the administrative assistant who will place the items in the appropriate mailbox.

Faculty

J. Jackson Barnette, Ph.D.
Associate Dean for Academic Affairs and Professor
852-8674, jack.barnette@louisville.edu
Research interests: Experimental design, measures of effect size and strength of association, survey and data collection instrument design and analysis, and program evaluation.

Somnath Datta, Ph.D.
Professor (Adjunct)
852-6376, somnath.datta@louisville.edu
Research interests: Various topics in Statistics and Biostatistics such as Bioinformatics, Bootstrap Methods, Compound Decision Problems, Empirical Bayes Methods, Nonparametric Function Estimation, Statistical Genetics, Survival Data Analysis, Time Series Analysis etc. Currently working on multistage data that are an important special case of multivariate survival or event time data. Also interested in nonparametric and semiparametric inference procedures for such multistage models. Interested in nonparametric inference procedures for marginal effects in clustered data, such as those arise in longitudinal studies. In the area of Bioinformatics, working on developing novel statistical methods for gene expression and proteomic data.

Susmita Datta, Ph.D.
Professor (Adjunct)
852-0081, susmita.datta@louisville.edu
Research interests: Bioinformatics, Biostatistics, Statistical issues in Population Biology, Statistical Genetics, Infectious Disease Modeling and Survival Analysis. Also involved in developing statistical methods for analyzing microarray data. I have been working on the problems of modeling gene expression profiles through partial least squares regression, validation of clustering algorithms for grouping genes and developing various statistical tools for detection of differential gene expression. I am also actively interested in proteomic data (MALDI-TOF, SELDI) analysis to understand disease etiology (colon, lung cancer etc.). I am involved in collaborative research with interdisciplinary scientists from Biochemistry, Biology, Public Health and Computer scientists.

Jeremy Gaskins, Ph.D.
Assistant Professor
852-3300, jeremy.gaskins@louisville.edu
Research interests: Longitudinal data, missing data models, covariance/correlation estimation, Bayesian methodology, and Markov chain Monte Carlo methods.

Bakeerathan Gunaratnam, Ph.D.
Assistant Professor
852-3525, b0guna01@louisville.edu
Research interests: Stochastic Processes, Multivariate Methods and Regression, and nonparametrics.

Maiying Kong, Ph.D.
Associate Professor
852-3988, maiying.kong@louisville.edu
Research interests: Parametric and semiparametric response surface modeling in drug interaction; Bioassay; Linear and nonlinear regression; High dimensional splines; Mixed effect models; Generalized linear models; Pre-clinical studies; Early phase studies; PD/PK modeling; Statistical computing.

K.B. Kulasekera, Ph.D.
Professor and Chair
852-6422, kb.kulasekera@louisville.edu
Research interests: My main research interests are in Survival Analysis, Multivariate Methods and Regression, Nonparametric Inference, Smoothing Methods, Varying Coefficient Models, Variable and Model Selection and Group Testing. Currently I am involved in several projects in group testing and variable/model selection.

Douglas J. Lorenz, Ph.D.
Associate Professor
852-3635, douglas.Lorenz@louisville.edu
Research interests: Survival analysis, nonparametrics, mixed effects models, child abuse research, and spinal cord injury research.

Ritendranath Mitra, Ph.D.
Assistant Professor
852-3986, ritendranath.mitra@louisville.edu
Research interests: Bayesian modeling for genomics and bioinformatics. Other interests include clinical trials, subgroup analysis, clustering and change-point models. Recently, I have been focusing on Bayesian graphical models and next generation sequencing data.

Subhadip Pal, Ph.D.
Assistant Professor
852-1297, s0pal001@exchange.louisville.edu
Research interests: Bayesian methodologies for statistical models including envelope regression for high-dimensional response linear models, MCMC algorithms and convergence, neuroimaging data, Bayesian nonparametric models on non-Euclidean manifolds

Shesh N. Rai, Ph.D.
Professor, Wendell Cherry Chair in Clinical Trial Research
Director, Biostatistics Shared Facility, JG Brown Cancer Center
852-4030, shesh.rai@louisville.edu
Research interests: Research Interests: Designing, Monitoring and Analyses of Clinical Studies involving Dichotomous, Normal and Time-to-event Outcomes in Cross-sectional and Longitudinal settings; Clinical Informatics involving micro-RNA (miRNA), Next Generation Sequencing (NGS), Metabolite Profiling, Differential Scanning Calorimetry (DCS) and Carbon Nanotube (CNT) Biosensor Outcomes.

Rebekah Robinson, Ph.D.
Assistant Professor
852-1297, ramuss01@louisville.edu
Research interests: Inference for change-point regression

Dongfeng Wu, Ph.D.
Associate Professor
852-1888, dongfeng.wu@louisville.edu
Research interests: Probability modeling and statistical inferences in periodic cancer screening.

Qi Zheng, Ph.D.
Assistant Professor
852-8780, qi.zheng@louisville.edu
Research interests: High dimensional data analysis, semiparametric and nonparametric models, varying effects survival analysis, personalized treatments, tree-based learning methods, and statistical applications in epidemiology and biomedical science

Staff

Christina Pinkston, MS
Biostatistician III
852-7676, christina.pinkston@louisville.edu

Bikash Bhandari, Ph.D.
Biostatistician II
852-4111, b0bhan02@exchange.louisville.edu

Lisa Bell
Program Coordinator
852-1827, lisa.bell@louisville.edu

II. INFORMATION FROM THE UNIVERSITY OF LOUISVILLE

Delayed Class Schedule for Bad Weather

Regular University classes follow the Delayed Class Schedule for Bad Weather, which is printed in the Schedule of Courses. Weekend classes may be canceled for bad weather. There is no delayed schedule for weekend classes. Faculty will make special arrangements to make up classes because of the cancellation.

University Holidays and Academic Calendars

In addition to the Calendar of Events, the UofL Web site has other calendars, including "University Holidays," which lists the dates university offices are closed. "Academic Calendars" cover the academic year.

Cardinal Card Student ID

New students receive a card during orientation. They should take their student ID and a photo ID to the main office in Room 08K of the Houchens Building (on the Belknap Campus) or to the satellite office at the first-floor security station of the Abell Building. Office hours are 8:30 a.m. to 5 p.m. weekdays at the main office and 2 p.m. to 4 p.m. Tuesdays at HSC. Hours will be extended and will include weekends at the beginning of the semester. Call for details.

Catalogs and Course Schedules
Registrar's Office, Houchens, 6522

The university course catalog is available here and the schedule of courses for past and current academic years here. New and returning students with a valid ID can get a copy of the undergraduate catalog or graduate catalog from the registrar's office, ACCESS office, Office of Admissions, University Bookstore, information centers, Office of Continuing Studies (Shelby Campus) and the Fort Knox Education Center. There is a $1 charge.

Financial Aid
Financial Aid Office, Houchens, 5511

When financial aid arrives, students will receive a residual check. Students can verify the status of financial aid forms, awards and electronically transferred funds here or they can call the automated voice response system at 2222.

Parking Permits
University Parking and Transportation Services, 5111

Please visit the University Parking and Transportation Services website for up to date permit prices, parking regulations, and maps.

Tuition Payment
Bursar's Office, Houchens, 6503

Information on tuition rates and payment options is available at the Bursar's office website.

Postal Services
Mail Services, 5339

A postal office is located on the ground level of the HSC Library & Commons Bldg. Hours of operation are 12noon-3pm, Monday through Friday. Phone number is 852-5339.

Department of Public Safety Escort Service
Department of Public Safety, 6111

The DPS provides an on-campus escort service seven days a week from dusk to dawn. Call DPS for an escort.

Health Insurance
Insurance Advocate, 6519

Student insurance plans include in-patient and outpatient care and spouse and dependent coverage. It is available for students who have no insurance or those who already have hospitalization coverage.

Routine Health Services
Belknap Campus, Health Services Building, 6479
HSC, Ambulatory Care Building, 6446

Student health services provide the same services as a regular physician and can give some prescriptions. Offices are open 8 a.m. to 4:30 p.m. Appointments are preferred.

Emergency Health Services

A student health services practitioner is on call after hours to answer questions via telephone that cannot wait until the next business day. HSC has a protocol for needle sticks that can be initiated over the telephone by calling 6446.
If an emergency takes place on campus, call 911 or the campus police at 6111.
During office hours, health services can take care of minor on-campus emergencies if the patient can come to the office. When a person needs medical attention after office hours, they should go to an immediate care center that is approved by their insurance carrier or to an emergency room.

Bookstore

HSC Bookstore, 5284

The Health Science Center Bookstore, located on the first floor of the K Wing Bldg. (Floyd Street Side), carries textbooks and supplies for courses taught on the HSC campus. Textbooks, lab coats, pens, binders and other supplies are available for purchase. Novelty items, sweatshirts, mugs, bumper stickers, greeting cards, candy and other items are also available. Hours of operation are:

9am-5pm	Monday-Friday
11am-2pm	Saturday

Gray's College Bookstore, located at 6565 Second Street off Broadway next door to McDonalds, also carries textbooks and supplies.

Libraries

Kornhauser Library, 5771

The Kornhauser Library, located on the second floor of the Library & Commons Building, is the main library for the HSC campus. Books related to the health sciences, professional journals and periodicals, and other publications are available to students. Hours of operation are:

7am-11pm	Monday-Thursday
7am-9pm	Friday
9am-9pm	Saturday
9pm-11pm	Sunday

Official and Unofficial Transcripts/Records Verification

Students may request official transcripts on-line through the University Registrar's Office. Students may also now print unofficial transcripts on-line.

Official transcript requests usually take 3-5 business days to be processed and mailed. Students may also request transcripts by going directly to the Registrar's Office on Belknap campus.

Students may be required to provide proof of good standing for scholarship applications, insurance forms, or to enroll at another school as a visiting student. When these situations occur, students should plan ahead and allow at least 24 hours for request of this nature to be processed. "While you wait service" is not available.

Address/Name Changes

It is the student's responsibility to notify the University of Louisville of any changes in name and/or address. Address, name, and phone number changes can be made by visiting ULink. If you fail to notify the school of your address change, the Department is not responsible for problems that may arise if information we distribute by mail is not received by you.

No Smoking Policy

The Health Science Center campus has been designated as smoke-free. Smoking is not allowed in any office, classroom, or laboratory site on the Health Science Center campus. Smoking is no longer allowed on the Health Sciences Campus, including outdoor areas.

Disability Statement

Students with disabilities, who need reasonable modifications to successfully complete assignments and otherwise satisfy course requirements, are encouraged to meet with the instructor as early as possible to identify and plan specific accommodations. Students may be asked to supply a letter from the Disability Resource Center or other documentation, which will assist in modification planning.

Policy on Work-Restricted Religious Holidays

Federal law and University policy prohibit discrimination on the basis of religious belief. Students who observe work-restricted religious holidays must be allowed to do so without jeopardizing their academic standing in any course. Faculty are obliged to accommodate students' requests for adjustments in course work on the grounds of religious observance, provided that the students make such requests in writing during the first two weeks of term.

The Department of Bioinformatics and Biostatistics Chair must investigate and resolve student complaints arising from alleged faculty failure to make reasonable accommodation under these guidelines.

Note: A calendar of typical work-restricted holidays is available online. This list is not exhaustive. Information about specific holidays is also available by phone from the University Multicultural Center at 8867.

Student Government Association

The purpose of the School of Public Health and Information Sciences Student Association" or "SPHIS Student Association" is to empower the students of SPHIS to make group decisions, take group actions, and participate in governance of SPHIS through an organization that is operated entirely by and for the students of SPHIS.

The intent of the Association is to become a Registered Student Organization in the University of Louisville.

A member of the Association is any student currently enrolled in a degree program in SPHIS, whether full-time or part-time. For a student to be considered currently enrolled, the student must be enrolled in at least one course. A newly enrolled student in a degree program in SPHIS is not a member until the first day of classes for the semester in which the student is first enrolled. If a member leaves the degree program in which he or she is enrolled, he or she is no longer a member.

A member of the Association is any student currently enrolled in a degree program in SPHIS, whether full-time or part-time. For a student to be considered currently enrolled, the student must be enrolled in at least one course. A newly enrolled student in a degree program in SPHIS is not a member until the first day of classes for the semester in which the student is first enrolled. If a member leaves the degree program in which he or she is enrolled, he or she is no longer a member.

Members may:

- Vote in elections or referenda of the Association
- Run for elected positions in the Association
- Serve on SPHIS Council of Chairs and Deans and SPHIS Faculty Forum
- Serve as representative of SPHIS on Graduate Student Council
- Petition for a meeting or vote by entire membership on one or more issue

SPHIS Policy on Academic Dishonesty

Determination of a Violation of Academic Honesty

A violation of academic honesty will be determined solely by the director of the course involved or, in the event that a violation of academic honesty is not related to a specific course, the director of the student's academic program. The information on academic dishonesty presented in the University policy, reproduced below, represents guidelines to help the student understand several major aspects of academic dishonesty. These guidelines cannot exhaustively define academic honesty or dishonesty.

If the student is uncertain whether a planned activity or behavior could be construed as a violation of academic honesty, the student is strongly advised to discuss the matter with the course director or, if applicable, the program director prior to engaging in the activity or behavior.

Absence of Consideration for Ignorance of Policies on Academic Honesty

Students are expected to be familiar with applicable policies on academic honesty. Ignorance of one or more of these policies will neither excuse a violation nor be considered in determining disciplinary actions.

Plagiarism and Electronic Sources of Information

The following is intended to amplify and emphasize the inclusion of electronic sources of information as sources that must be cited as references when material is used from them. Information that is available through the Internet or from other electronic sources is not considered to be common knowledge solely because it is available widely and electronically. Designation of common knowledge is limited to knowledge that is widely known either generally or within a specific field or discipline. If the student is unclear whether an item of information is common knowledge or not, he or she is strongly advised to cite the source.

Disciplinary Procedures for a Violation of Academic Honesty

The course director may take whatever disciplinary action or actions he or she determines to be appropriate in response to a violation of academic honesty. These actions may include, for example, failing the course and denial of retaking the course.

The course director may also recommend to the academic program director that the student be dismissed or expelled from the program, which may be done at the sole discretion of the program director.

If the violation of academic honesty is not related to a specific course, the program director may take whatever disciplinary action he or she determines to be appropriate, including, for example, suspension or dismissal from the program.

Registration Procedures

The University of Louisville ULink course registration system is available online. You will need you student ID number, password, and the four digit number assigned to each course in order to add, drop, or exchange courses in ULink. The University has also implemented a touchtone registration system, (502) 852-2222. Students register for courses by phone according to the total number of credit hours and an alphabetic rotation established by the University's Office of Registration. Specific registration instructions will be listed in the Schedule of Courses each semester.

Students are required to meet with the Program Director prior to registration for assistance in course selection. If students have any questions about procedures, they should contact the department assistant Lynne Dosker at 852-1827.

Students who register for courses without having met the prerequisites will have their registration canceled and will be required to re-register on a space available basis. Registrations will also be canceled for continuing students on probationary status who fail to meet with their Program Director prior to registering. Advising holds are placed on all students prior to each semester's open registration period. The hold will be removed after the student receives approval from the Program Directors. Re-registration will be on a space available basis.

Drop/Add Procedures

Students wishing to alter their schedule of courses in any way must make the changes with the University's Office of Registration. Failure to officially withdraw from a course may result in a grade of F.

Students may drop/add at any time during the Early Registration period after their first scheduled time for registration. The touch-tone and ULink systems may be used for drop/add. See the Schedule of Courses for current instructions for Drop/Add after classes begin.

Students may not withdraw from any course after the published deadline in the Schedule of Courses without the approval of their assigned advisor and Graduate School Dean. The grade report will reflect a grade of "W".

Assistantship students are required to be enrolled full-time (nine hours in both the fall and spring semesters and six hours in the summer) in order to maintain those assistantships. Any student who drops below a full-time course load will have their assistantship pay suspended.

Guidelines for Graduate Research Assistants

Students under graduate research assistantships (GRA) are required to perform work at the direction of faculty members to whom they are assigned at the beginning of each academic term as a condition of their assistantship. The following are guidelines for GRA conduct and attendance at the Department:

1. GRA that need to be absent from the university during any academic term (fall, spring, summer) must notify the Department Chair of the time period for the absence and receive prior approval from the Department Chair.
2. In emergency situations, GRA are asked to notify the Department Chair or Administrative Assistant of the absence as soon as possible. The Department will determine a reasonable amount of time for the absence based on the nature of the emergency.
3. GRA duties begin and GRA need to be present at the Department two calendar days prior to the first day of class in each academic term (fall, spring, summer) as identified in the university academic calendar.
4. In fall and spring terms, GRA duties end on the day of commencement. In summer terms, GRA duties end the day after the last day of classes.
5. Students must contact the faculty member(s) to whom they have been assigned within 2 days of being notified of the assignment.

III. CURRICULUM

The school based M.P.H. Degree program offers a concentration in Biostatistics. The department based Master's program has both thesis and non-thesis options. The doctoral program in Biostatistics also offers an additional emphasis track in Bioinformatics. Each emphasis at the doctoral level focuses on the respective discipline with regard to coursework, although some electives may be taken by students in the other concentration area.

The Ph.D. program will be available to students who are continuing in the UofL MS program and to students entering the program with a Master's degree in biostatistics, statistics, or related discipline. In conjunction with their advisor, students will develop a plan for completing required and elective courses.

Program of Study

Upon admission to a degree program, a Program of Study will be developed for each student by a faculty advisor and approved by the Department Chair. The Program Director will assume the role of faculty advisor until the student chooses a thesis/dissertation advisor at which point this responsibility will be shifted to the thesis/dissertation advisor. If it becomes clear that a Ph.D. student will be working with a given faculty member prior to forming a dissertation committee, the student may request a change in course advisor by completing the form "Request to Change Academic Advisor" form and having it signed by the Program Director, the new academic advisor, and the Department Chair. Ph.D. students who did not complete the MS in the Department of Bioinformatics and Biostatistics may be required to complete additional coursework normally offered in the MS program. Decisions regarding additional coursework will be made by the faculty advisor and such courses will become part of the Program of Study. This approach gives maximum flexibility for addressing differing student qualifications and interests.

Master's of Public Health (M.P.H.)

Program Director:	Robert R. Jacobs, Ph.D.
Program Administrator:	Tammi A. Thomas
Website:	http://louisville.edu/sphis/academics/mph-program

The Master's of Public Health (M.P.H.) degree program is a school-based program designed to graduate students each with core competencies in public health and specialized competencies in one of several concentrations including biostatistics, environmental and occupational health, epidemiology, health management, and health promotion and behavior.

Please check the above web-site for a description of the current curriculum.

Master's of Science (MS) in Biostatistics

Program Director: K.B. Kulasekera, Ph.D.
Administrative Assistant: Lisa Bell
Department: Bioinformatics and Biostatistics
Website: MS in Biostatistics

Introduction

Biostatistics involves the development and application of statistical techniques to scientific research in health-related fields including medicine, nursing, and public health. Students in the MS program receive state-of-the-art training in the latest statistical methodologies with focus on the design of research studies, modern statistical data analysis in health sciences research, and research in Biostatistical methodology. In addition, students are provided with tools with which to develop evidence-based clinical and healthcare policies and guidelines.

Competencies

To graduate, a student must be able to demonstrate mastery of the following competencies:

Competency*
Evaluate the biostatistics content of scientific and biomedical journal articles. [C6]
Analyze moderately complex research data using statistical methods involving common linear statistical models. [C4]
Manage data using spreadsheet and database software. [C3]
Demonstrate use of standard statistical and graphics computer packages, including SAS, R, Microsoft Excel, and SPSS. [C3]
Evaluate new statistical methods presented in the literature. [C6]
Investigate the history, theoretic underpinnings, current applications, and active areas of inquiry of biostatistics. [C4]
Apply principles and theorems of advanced biostatistical operations. [C3]

* Bracketed codes represent cognitive domain levels from Bloom's Taxonomy

Demonstration of the competencies is accomplished by successful completion of all MS curriculum activities.

Admission

The MS program is available to students who have completed an undergraduate degree in biostatistics, statistics, mathematics, or a related discipline and possess competency in college-level multivariable calculus and statistics as evidenced by transcripts from postsecondary institutions attended. The following are required for admission:

- Graduate application submitted to the School of Interdisciplinary and Graduate Studies (SIGS).
- Non-refundable application fee.
- At least two letters of recommendation written within past twelve months, submitted as part of the graduate application.
- GRE Scores are required and are considered in the context of other required components of the application. Students who have been successful in our programs in the past typically have a median [Q1, Q3] GRE Quantitative score at the 80th percentile [63, 91].
- All postsecondary transcripts. Transcripts from institutions outside of the U.S.A. require a foreign credential evaluation.
    - The minimum undergraduate grade point average that will be considered for unconditional acceptance and admission is 3.0 on a 4.0 scale. Applicants with a GPA of 2.75 or above may be considered for a conditional admission based on the overall quality of the application. Contingencies placed on such cases may vary by the student.
- A statement of purpose submitted to the department office, which must include desired degree program.
- International students for whom English is not their primary language must show English language proficiency by one of the following:
    - TOEFL examination score at or above 550 (paper based test and a 5.0 on the TWE test), 213 (computer based test), 79 (internet based test)
    - IELTS test score of 6.5 or higher
    - Successfully passing the exit examination for the advanced level of an Intensive English as a Second Language Program
    - Demonstration of a degree awarded from an institution with instruction primarily in English, as formally documented by an appropriate institutional official

Curriculum

Faculty Advisor

Upon admission to the MS program, the program director serves as the student's faculty advisor until a mentor for the student's project or thesis is identified. At this milestone, the mentor becomes the student's faculty advisor.

Program of Study

Upon admission to the MS program, the program director, working with the student as faculty advisor, develops a program of study for the student, which requires agreement by the student and the academic dean. Changes to a student's program of study, including coursework, milestones, and their anticipated timings, are made by the student's faculty advisor, working with the student, and formally signed by the student, the faculty advisor, the program director, and, for selected changes, the academic dean. This flexibility allows adapting programs of study to differing student then current capabilities and interests.

Degree Requirements

The MS program in biostatistics can be completed on one of three tracks. The descriptions below are for students who have completed all prerequisite courses for required and elective courses included in each degree program. Additional credit hours may be needed for remediation of missing or lacking student capabilities encountered following matriculation or for capabilities outside the standard coursework required for an identified project or thesis.

The Standard Track is a 30 credit hour, non-thesis curriculum that emphasizes a broad understanding of biostatistics and can be completed in three semesters by full-time students.

The Bioinformatics Track is a 30 credit hour, non-thesis curriculum that is based on coursework in bioinformatics and biostatistics and can also be completed in three semesters by full-time students.

The Thesis Track involves continuing beyond the required coursework for the Standard Track to pursue the preparation and defense of a master's thesis in an additional semester, during which the student enrolls for a thesis research course for no fewer than 6 credit hours. The Thesis Track is generally recommended for students intending to pursue a Ph.D. degree or wanting to pursue a research project that interests them. However, a master's thesis is a requirement for the Thesis Track only. A student who elects to pursue a thesis on the Thesis Track and subsequently does not successfully complete the thesis remains eligible for the award of degree under the Standard Track.

Students will declare their intended degree track upon entrance to the program. Students may choose to move onto a different track upon discussion with the Program Director. However, switching between the Standard Track and the Bioinformatics Track will typically lead to a delay in degree fulfillment due to the differences in the required coursework. Students intending to graduate on the Thesis Track will begin the program on the Standard Track. At the completion of the spring semester of the first year for full-time students (the completion of at least 19 hours for part time students), students that have not yet declared for the Thesis Track may declare for the Thesis Track, if desired.

Award of degree from an accredited school of public health requires successful completion of the equivalent of two credit hours of instruction that introduces the students to the breadth of public health. This requirement may be determined to have been met prior to matriculation by approval of the academic dean of a variance request submitted by the program director. The request for a variance in the requirement must be justified by (1) previous degrees received, such as an MPH or Dr.P.H., (2) previous coursework successfully completed, or (3) extensive experience in the public health workforce. In the absence of a variance for a requirement, the student's program of study must include successfully completed coursework that satisfies the requirement.

Standard Track Curriculum (Full-Time)

Semester	Course No.	Course Title	Credits
Fall 1	PHST 661	Probability	3
	PHST 680	Biostatistical Methods I	3
	PHST 624	Clinical Trials I	2
	PHPH 523	Public Health in the U.S.[1]	(2)
		Semester Total	8 (10)
Spring 1	PHST 662	Mathematical Statistics	3
	PHST 681	Biostatistical Methods II	3
	PHST 684	Categorical Data Analysis	3
	PHST 625	Clinical Trials II	2
		Semester Total	11
Fall 2	PHST 683	Survival Analysis	3
	Various	Electives[2]	2
		Semester Total	11
		Degree Total	**30**

1. PHPH 523 fulfills the accreditation requirement that all graduates from the School of Public Health and Information Science receive foundational instruction in public health. The two credit hours for PHPH 523 do not

accrue toward the 30 hours required for MS degree completion. Students with a prior degree and/or coursework in a public health field or substantial experience in the public health workforce may be relieved of this requirement, per approval of the Associate Dean for Academic Affairs.

2. Electives are chosen with the approval of a faculty advisor. Students are typically encouraged to select electives from among the following courses offered by the Department of Bioinformatics and Biostatistics:

PHST 603	Biostatistics Public Health Practicum I
PHST 620	Introduction to Statistical Computing
PHST 640	Statistical Methods for Research Design in Health Sci.
PHST 675	Independent Study in Biostatistics
PHST 682	Multivariate Statistical Analysis

Subject to the approval of a faculty advisor, students are also welcome to choose elective courses outside of the department in fields related to biostatistics, such as Mathematics, Epidemiology, and Computer Science. Students seeking to pursue elective coursework outside the department are responsible for ensuring they have met the prerequisites for these courses.

Bioinformatics Track Curriculum (Full-Time)

Since the curriculum for the Bioinformatics track differs from the Standard Track at the beginning of the first semester of study, students electing the Bioinformatics Track must declare this choice at or before enrollment.

Semester	Course No.	Course Title	Credits
Fall 1	PHST 661	Probability	3
	PHST 680	Biostatistical Methods I	3
	BIOC 545	Biochemistry I	3
	PHPH 523	Public Health in the U.S.[1]	(2)
		Semester Total	9 (11)
Spring 1	PHST 662	Mathematical Statistics	3
	PHST 681	Biostatistical Methods II	3
	Various	Electives[3]	3
		Semester Total	9
Fall 2	PHST 710	Advanced Statistical Computing I	3
	PHST 655	Basic Stat Methods for Bioinformatics	3
	PHMS 641	Data Mining I	3
	Various	Electives[3]	2
		Semester Total	12
		Degree Total	**30**

3. Students must accumulate a minimum of 6 credit hours of electives. These may be distributed among semesters as the student chooses. Electives are chosen with the approval of a faculty advisor. Students are encouraged to select electives from among the following courses.

PHST 603	Biostatistics Public Health Practicum I
PHST 620	Introduction to Statistical Computing
PHST 675	Independent Study in Biostatistics
PHST 684	Categorical Data Analysis
PHEP 648	Data Management and Analysis for Epi I
BIOC 547	Biochemistry II
BIOC 603	Special Topics in Biochemistry
BE 540	Machine Learning and Medicine

Thesis Track Curriculum

The curriculum for the Thesis Track of the MS degree consists of additional thesis hours beyond the completion of the curriculum for the Standard Track. Students must declare to enroll in the Thesis Track at the competition of the spring semester of the first year for full-time students (the completion of at least 19 hours for part time students). Only after completion of the required 30 hours of coursework in the Standard Track curriculum, students electing to be in the Thesis Track enroll for a minimum of 6 hours of thesis research (PHST 666) in the spring semester of the second year, and typically write and defend a thesis by the end of that semester.

Semester	Course No.	Course Title	Credits
Spring 2	PHST 666	Master's Thesis Reseach[4]	6
		Semester Total	6
		Degree Total	**36**

4. Students wishing to maintain full-time status may register for more than 6 hours of thesis or additional coursework.

Thesis

A student may apply to pursue preparation and defense of a master's thesis following completion of the required coursework. Pursuing an optional thesis requires permission of the program director. The thesis topic is approved by the major professor and thesis committee, chaired by the major professor. The student identifies a desired mentor to become his or her major professor, who is recommended by the program director and appointed by the academic dean. The major professor (or at least one when there are co-major professors) must

be from the Department of Bioinformatics and Biostatistics. Following appointment, the major professor becomes the student's faculty advisor. Procedures for the thesis are given below.

Thesis Committee

Working with the major professor, the student identifies at least two or more desired committee members. Including the major professor, at least two members of the committee must be faculty in the Department of Bioinformatics and Biostatistics and at least one member must be from outside the department. The committee members are then recommended by the program director and appointed by the academic dean.

Thesis Preparation

The thesis is prepared in format according to the guidelines established by the School of Interdisciplinary and Graduate Studies. It is the responsibility of each student to ensure that the readability and quality of writing in his/her thesis meets professional standards. Students are strongly encouraged to take advantage of the services offered by the University Writing Center when writing their theses. The services offered by the Writing Center are free to the student.

Thesis Approval

Final approval of the thesis is voted upon by the thesis committee after an oral defense of the thesis by the student. Students submit their theses to members of their committee two or more weeks prior to the date of the oral defense. Approval of the thesis is by majority vote of the committee after the oral defense.

Students are required by SIGS to provide two weeks' notice when scheduling oral defenses (http://louisville.edu/graduate/forms/request-to-schedule-thesis-dissertation-final-oral-examination). This requirement permits those wanting to attend the oral defense adequate time to make arrangements for attending. Students must follow the below procedure for scheduling oral defenses:

1. Identify a date and time for the oral defense in consultation with the thesis advisor and members of the committee.
2. Request a room reservation for the oral defense through the Department's Administrative Assistant.
3. Notify the Department's Administrative Assistant of the date, time, and location of the oral defense as well as the title of the thesis. The Department's Administrative Assistant will circulate an announcement of

the defense as well as notify the SPHIS Office of Student Services of the defense, who in turn notify SIGS.
4. Distribute technically and grammatically error-free copies of the thesis to all committee members at least two weeks prior to the defense date.

There are no exceptions to these requirements and students will not be permitted by the Department to schedule defenses with less than 2 weeks' notice. Students are expected to be aware of university deadlines for theses (http://louisville.edu/graduate/current-students/thesis-dissertation-information) and to ensure that the 2 weeks' notice requirement is fulfilled within these university deadlines. Students are strongly encouraged to allow for even greater than two weeks' notice to ensure that all deadlines and requirements are fulfilled.

Thesis Submission

The following steps must be taken to submit the final copy of the thesis electronically after oral defense and approval of the committee:

1. Final document must be converted to a PDF (following the guidelines as noted above) and sent to SIGS and the department's administrative assistant.
2. Submit as advised by the School of Interdisciplinary and Graduate Studies through the ThinkIR repository. Click here to download instructions on this process.
3. The signature page within the electronic version must have the names of the committee members typed under the signature line; the signatures cannot be scanned into the document.
4. Submit a signed signature page on white paper, with original signatures, to the School of Interdisciplinary and Graduate Studies.

An electronic copy of the thesis must be provided to the Department's Administrative Assistant.

Accreditation

This program is accredited by the Council on Education for Public Health (CEPH).

The University of Louisville is accredited by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC).

For more information, see the School's accreditation webpage.

Doctor of Philosophy (Ph.D.) in Biostatistics

Program Director:	K.B. Kulasekera, Ph.D.
Administrative Assistant:	Lynne C. Dosker
Department:	Bioinformatics and Biostatistics
Website:	Ph.D. in Biostatistics

Introduction

Biostatistics involves the development and application of statistical techniques to scientific research in health-related fields, including medicine, epidemiology, and public health. Students in the Ph.D. program receive state-of-the-art training in the latest statistical methodology in order to tackle the challenges associated with the study design and data analysis of modern research conducted in the health sciences. The Ph.D. program provides advanced training in biostatistical theory and methods, with the goal of enabling the student to carry out original research. In addition, students may elect to train with an emphasis in bioinformatics.

Bioinformatics requires the development and application of statistical methods for many of the areas covered by the field, including genomics, proteomics, statistical genetics, and metabolomics. Current biomedical research technologies generate high volumes of data that require extension of existing statistical methodologies and development of new methodologies in order to extract important information regarding biological processes. The emphasis on bioinformatics is designed to fulfill the expanding need for biostatisticians with advanced training in this area. Students in the bioinformatics emphasis gain a basic understanding of molecular and cellular biology, genetics, and bioinformatics and an in-depth knowledge of statistical theory and methods. Graduates are able to carry out original statistical research in genomics, proteomics, metabolomics, and evolving areas of systems biology.

Students who complete the MS program in biostatistics with the Department of Bioinformatics and Biostatistics or who already possess the equivalent of an MS in statistics, biostatistics, or a related discipline may apply for admission to the Ph.D. program.

Competencies

To graduate, a student must be able to demonstrate mastery of the following competencies:

Competency	Demonstration*		
	CE	SCP	Dsrt
Read, interpret, and critically review the biostatistics content of scientific and biomedical journal articles	x		x
Analyze moderately complex research data using statistical methods involving common linear statistical models	x	x	
Analyze dichotomous, count, and time-to-event data using appropriate statistical methods, including logistic regression, log-linear models, Kaplan-Meier curves, and Cox proportional hazards models	x	x	
Assist researchers in planning research studies, proposing and evaluating statistical methods and computing power analyses		x	
Write statistical methods sections for grant proposals, clinical trial protocols, and journal articles	x		
Manage data using spreadsheet and database software	x		
Use standard statistical and graphics computer packages including SAS, R, and SPSS	x	x	x
Keep abreast of statistical methods literature to evaluate and utilize new statistical methods			x
Thoroughly understand the broad discipline of biostatistics, including its theoretic underpinnings, its history of development, current applications, and areas of active inquiry	x		x
Understand advanced biostatistical operations	x		x
Conduct independent research			x
Advance the field of biostatistics through original research			x

Students who elected to emphasize on bioinformatics must demonstrate the following additional competencies, many of which represent specialization of competencies cited above:

Competency	*Demonstration**		
	CE	*SCP*	*Dsrt*
Analyze high-throughput, biological data, such as microarrays, SNP chips, and mass spectrometer data, and understand the special statistical considerations that such data require	x	x	
Retrieve and leverage various types of biological information from online repositories	x	x	
Understand the basic biological principles that underlie our biological knowledge, and how the various forms of high-throughput data are used to address specific biological questions and expand our knowledge	x		x
Advance the field of statistics in bioinformatics through original research			x

*Key for demonstration (method): CE = Comprehensive examinations

SCP = Statistical consulting practicum
Dsrt = Dissertation

Admission

The Ph.D. program is available to students who are entering from the M.S. program or to students entering with a master's degree in biostatistics, statistics, decision science, or a related discipline.

The following are additionally required for admission:

- Graduate application
- Non-refundable application fee
- At least two letters of recommendation written within past twelve months, which may be submitted with the Graduate application
- GRE Scores are required and are considered in the context of other required components of the application. Students who have been successful in our programs in the past typically have a median [Q1, Q3] GRE Quantitative score at the 87th percentile [75, 92].
- All postsecondary transcripts (may require foreign credential evaluation if not from an accredited U.S. institution)
- Statement of goals, including the desired emphasis, if any.
- International students for whom English is not their primary language must show English language proficiency by one of the following:

- TOEFL examination score at or above 550 (paper based test and a 5.0 on the TWE test), 213 (computer based test), 79 (internet based test)
- IELTS test score of 6.5 or higher
- Successfully passing the exit examination for the advanced level of an Intensive English as a Second Language Program
- Demonstration of a degree awarded from an institution with instruction primarily in English, as formally documented by an appropriate institutional official

Curriculum

The curriculum consists of a minimum of 34 credit-hours of coursework, a comprehensive examination, and a doctoral dissertation. The student is eligible to sit for the comprehensive examination upon completion of required coursework detailed below. Upon passing the comprehensive examination and completing required and elective coursework, the student enters candidacy to work on the dissertation. After the dissertation is submitted and approved, including an oral defense, the student is eligible to receive the Ph.D. degree in biostatistics.

Award of a degree from an accredited school of public health requires successful completion of the equivalent of three semester-credit hours in each of:

- Instruction that introduces the students to the breadth of public health
- Instruction in epidemiology

Either or both of these requirements may be determined to have been met prior to matriculation by approval of the academic dean of a variance request submitted by the program director. The request for a variance in one or both requirements must be justified by one of: previous degrees received, such as an MPH or Dr.P.H.; previous coursework successfully completed; or extensive experience in the public health workforce. In the absence of a variance for a requirement, the student's program of study must include successfully completed coursework that satisfies the requirement. This coursework may be included in the program's required coursework; if not, the student must complete appropriate coursework on a co-curricular basis.

Faculty Advisor

Upon admission to the Ph.D. program, each student is assigned to the graduate coordinator of the Ph.D. program for course advising. The graduate coordinator assumes the role of faculty advisor until the student chooses a dissertation advisor at which point this responsibility shifts to the dissertation advisor. If it

becomes clear that a Ph.D. student will be working with a given faculty member prior to forming a dissertation committee, the student may request a change in course advisor by completing the form "Request to Change Academic Advisor."

Program of Study

Upon admission to the Ph.D. program, a program of study is developed for each student by the faculty advisor and approved by the program director and department chair. Students who did not complete the MS program in biostatistics with the Department of Bioinformatics and Biostatistics may be required to complete additional coursework normally offered in the MS program. Decisions regarding additional coursework are made by the student's assigned faculty advisor and such courses become part of the program of study. This approach gives maximum flexibility for addressing differing student qualifications and interests.

Degree Requirements

Completion of required coursework is the prelude to sitting for the comprehensive examination. Successful completion of the comprehensive examination allows the student to enter doctoral candidacy. A doctoral candidate must then develop and successfully defend a dissertation proposal that describes an original and independent research project. Upon successful defense of the proposal, a student may then proceed to continue dissertation research. Upon successful completion of the research, defense of the dissertation, and demonstration of the required competencies listed below, a student is awarded the Ph.D. degree.

Coursework

34 total credit-hours
- 12 credit-hours of required coursework
- 22 credit-hours of elective courses

Required Coursework			
Emphasis	***Course #***	***Course Title***	***Credit Hours***
All	PHST-691	Bayesian Statistics	3
	PHST-710	Advanced Statistical Computing I	3
	PHST-762	Advanced Statistical Inference	3
	PHST-781	Advanced Linear Models	3
	Subtotal		12

Elective Coursework			
Emphasis	***Course #***	***Course Title***	***Credit Hours***
None	PHST-703	Doctoral Practicum in Consulting	1
	PHST-724	Advanced Clinical Trials	3
	PHST-782	Generalized Linear Models	3
	PHST-783	Advanced Survival Analysis	3
	various	Additional Electives	12
	Subtotal		22
Bioinformatics	PHST-703	Doctorial Practicum in Consulting	1
	PHST-750	Statistics for Bioinformatics	3
	PHST-751	High-Throughput Data Analysis	3
	CECS-632	Data Mining	3
	BIOC-545	Advanced Biochemistry I	3
	various	Additional Electives	9
	Subtotal		22
Degree Total			**34**

The student may be required to take one or more prerequisite courses for a required course if the student does not meet the prerequisites. These prerequisite courses become part of the program of study but are in addition to the number of coursework credit-hours presented above.

Electives

The 9 hours of Additional Electives listed in the table on the previous page must be taken from the following list. The student's program of study specifies the particular courses permitted to be taken.

Electives				
Emphasis		***Course #***	***Course Title***	***Credit Hours***
--	***B***			
X	X	PHST-675	Independent Study in Biostatistics	1-3
X	X	PHST-682	Multivariate Analysis	3
X	X	PHST-704	Mixed Effect Models and Longitudinal Data Analysis	3
X	X	PHST-711	Advanced Statistical Computing II	3
X	X	PHST-725	Design of Experiments	3
X		PHST-750	Statistics for Bioinformatics	3
X		PHST-751	High-Throughput Data Analysis	3
X	X	PHST-752	Statistical Genetics	3
X	X	PHST-780	Advanced Nonparametrics	3
	X	PHST-782	Generalized Linear Models	3

Electives				
Emphasis		*Course #*	*Course Title*	*Credit Hours*
--	*B*			
X	X	PHST-785	Nonlinear Regression	3
X		CECS-632	Data Mining	3

"--" indicates the No emphasis option; "B" indicates the Bioinformatics emphasis.

The student may be required to take one or more prerequisite courses for an elective course if the student does not meet the prerequisites. These prerequisite courses become part of the program of study but are in addition to the number of coursework credit-hours presented above. Enrollment in other courses such as PHPH 701 may be required to maintain academic status for funding purposes.

Sample Program of Study – Year 1

Semester	*Emphasis*	*Courses*	*Credit Hours*
Fall	All	PHST-710, 762, 781	9
Spring	No Emphasis	PHST-691 Any TWO of PHST-724, 751, 782, 783	9
	Bioinformatics	PHST-691 Any TWO of PHST-750, 751, 724, 782	9
Summer	All	PHST-703	1

All pre-candidacy PhD students on support of any kind (Fellowship, GRA, TA, Hourly) must be enrolled in the Department's seminar course (PHST 602) for 1 credit hour during semesters they are supported.

Comprehensive Examination

Prior to the beginning of the student's second year in the Ph.D. program, he/she will take a written Comprehensive Examination. The objective of this examination is for the student to demonstrate a comprehensive knowledge of statistical theory and methods as learned in the courses taken during the first year in the program. This examination is given over two consecutive days shortly before the start of the fall semester. Students will be notified of the dates and location at least one month in advance. Students must have passed PHST-691, PHST-710, PHST-762, and PHST-781 before they may take the comprehensive examination.

The examination will consist of four sections, each corresponding to one of the required courses (PHST-710, PHST-762, PHST-781, PHST-691) and each given

individually. Each section is designed to test the student's competency in a core area of the discipline and to assess his/her ability to apply this knowledge to solve new and/or complex problems.

- The Statistical Inference (PHST-762) section will be a two-hour written examination given on the first day.
- The Linear Models (PHST-781) section will be a two-hour written examination taking place on the first day.
- The Bayesian Inference section (PHST-691) will be a one and a half hour written examination and a one and a half hour computing exam, both given on the second day.
- The Computing section (PHST-710) will be a three hour computing examination given on the second day.

Material from courses corresponding to each section of the comprehensive exam will help students prepare for those sections. However, questions from any sources may appear that cover the same topics as listed in the syllabi of PHST 691, PHST 710, PHST 762, and PHST 781. Further, problems on the Computing section of the exam may draw on topics covered in PHST 691, PHST 762, and PHST 781.

Each student receives a grade of either "pass" or "fail" for the entire comprehensive examination and each student must pass all four sections of the comprehensive examination to receive a "pass". Students that pass the exam will be eligible to enter doctoral candidacy upon completion of the remaining, second-year coursework. A failing grade indicates deficiency in one or more areas, and a student with a grade of "fail" will have one opportunity to retake the full Comprehensive Examination (all four sections), typically in the following January. The results from a student’s first attempt at the comprehensive exam will not be considered in the grading of the second attempt and will not factor into the determination of a “pass” or “fail” score for the second attempt at the exam. Students that fail to pass the examination on their second attempt will be dismissed from the program without any further consideration.

Neither scores nor graded copies of completed examinations will be shared with students. Students may review ungraded copies of their own completed comprehensive exams with the exam graders. The ungraded, completed copies will be held in the department office. Students will not be permitted to keep ungraded copies of the completed comprehensive exams.

Special Notes on the Comprehensive Exam

- For all the exams, the students will not have access to any course books, notes or any other materials (paper or electronic copies)

- Students will write programs and run code in the Bayesian and non-Bayesian computing examinations of the second day. These examinations will be given either in a computer lab in the SPHIS building or the students will be required to bring their own laptop to run the programs.
- The only materials which can be consulted for the second day examination are R help menus locally available on the specific computer. Students will be asked ahead of time to upload all R packages needed to appear for the exam. Students will not be allowed to avail the internet by any means.
- Any suspected cheating on the Comprehensive Examination will be addressed according to university policies provided in Section 5 of Dean of Students' document, Students Rights and Responsibilities. Additionally, students found guilty of academic dishonesty on the Comprehensive Examination will be expelled from the Ph.D. program immediately.
- More than one faculty members will grade each examination.

Dissertation

In order to complete the degree, a candidate must submit and successfully defend a dissertation on a topic approved by his or her major professor and the dissertation committee. Dissertation work may be started following successful completion of doctoral comprehensive examinations.

Dissertation Committee

The dissertation committee is formed by the candidate's proposing a major professor (or principal advisor) and at least four other committee members. The major professor (or at least one when there are co-major professors) must be from the Department of Bioinformatics and Biostatistics. One member of the dissertation committee must be external to the Department of Bioinformatics and Biostatistics. The committee is appointed by the dean of the school upon the recommendation of the program director and chair of the department.

Dissertation Proposal (Pre-Dissertation Essay)

A dissertation proposal or pre-dissertation essay is submitted to the major professor and the dissertation committee. Students must make an oral presentation of the proposal to the dissertation committee, after which the members of the committee vote upon approval of the proposal (see below for guidelines regarding scheduling the proposal defense). The proposal must be approved by a majority vote of the dissertation committee before the candidate undertakes further work on the dissertation.

The dissertation proposal is a typed document not exceeding 25 pages in length excluding topics (v) to (viii), below. The following formatting is used: Times New Roman 12-point font, margins of 1 inch on all sides and 1.5-line spacing throughout the body of the document. The Graduate School dissertation guidelines for citing references must be followed. The document is divided into the following sections and in the following sequence:

(i) Introduction and Literature Reviews – general introduction to the area of proposed research and relevant literature reviews
(ii) Specific Aims and Significance – short section describing the specific aims of the proposed research and their potential importance in the field
(iii) Preliminary Results – summary of the research findings the student already has (e.g., simulation results) towards one or more of the specific aims. This is an important component of the proposal that demonstrates the feasibility of the proposed research by the student.
(iv) Research Plan – detailed description of the research towards the specific aims to be undertaken during the rest of the doctoral study period
(v) References – complete references to all the cited literature. Journal names should not be abbreviated
(vi) Tables – including table headings
(vii) Figures – one figure per page
(viii) Appendix – copies (in PDF format) of published articles and preprints that are most relevant to the proposed research

Dissertation Preparation

The dissertation is to be prepared in format according to the guidelines established by the School of Interdisciplinary and Graduate Studies. It is the responsibility of each student to ensure that the readability and quality of writing in his/her dissertation meet professional standards. Students are strongly encouraged to take advantage of the services offered by the University Writing Center when writing their dissertations. The services offered by the Writing Center are free to the student.

Dissertation Approval

Final approval of the dissertation is voted upon by the dissertation committee after an oral defense of the dissertation by the student. Students submit their dissertations to members of their committee two or more weeks prior to the date of the oral defense. Approval of the dissertation is by majority vote of the committee after the oral defense.

Students are required by SIGS to provide two weeks' notice when scheduling oral defenses (http://louisville.edu/graduate/forms/request-to-schedule-

thesis-dissertation-final-oral-examination). This requirement permits those wanting to attend the oral defense adequate time to make arrangements for attending. Students must follow the below procedure for scheduling oral defenses:

1. Identify a date and time for the oral defense in consultation with the dissertation advisor and members of the committee.
2. Request a room reservation for the oral defense through the Department's Administrative Assistant.
3. Notify the Department's Administrative Assistant of the date, time, and location of the oral defense as well as the title of the dissertation. The Department's Administrative Assistant will circulate an announcement of the defense as well as notify the SPHIS Office of Student Services of the defense, who in turn notify SIGS.
4. Distribute technically and grammatically error-free copies of the dissertation to all committee members at least two weeks prior to the defense date.

There are no exceptions to these requirements and students will not be permitted by the Department to schedule defenses with less than 2 weeks' notice. Students are expected to be aware of university deadlines for dissertations (http://louisville.edu/graduate/current-students/thesis-dissertation-information) and to ensure that the 2 weeks' notice requirement is fulfilled within these university deadlines. Students are strongly encouraged to allow for even greater than two weeks' notice to ensure that all deadlines and requirements are fulfilled.

Dissertation Submission

The following steps must be taken to submit the final copy of the dissertation electronically after oral defense and approval of the committee:

1. Final document must be converted to a PDF (following the guidelines as noted above) and sent to SIGS and the department's administrative assistant.
2. Submit as advised by the School of Interdisciplinary and Graduate Studies through the ThinkIR repository. Click here to download instructions on this process.
3. The signature page within the electronic version must have the names of your committee members typed under the signature line; the signatures cannot be scanned into the document.
4. Submit a signed signature page on white paper, with original signatures, to the School of Interdisciplinary and Graduate Studies, attention Courtney Kerr.

An electronic copy of the dissertation must be provided to the Department's Administrative Assistant.

Applying for a Degree

Students are responsible for completing an "Application for Degree" form at the beginning of the semester in which they will defend their thesis or dissertation. These forms can be found at the Graduate School on Belknap Campus in either Jouett Hall or the Houchens Building, or can be obtained from the Department of Bioinformatics and Biostatistics assistant. The form must be submitted to the Graduate School by the due date posted for the respective graduation semester. Future deadline dates can be found on the Graduate Academic calendar.

For any questions or concerns students might have during the semester in which they plan to graduate in, students' best resource is the Graduate School. The Department of Bioinformatics and Biostatistics faculty and staff are also here to advise and assist you with any questions you might have.

Accreditation

The Program is accredited by the Council on Education for Public Health (CEPH).

The University of Louisville is accredited by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC).

For more information, see the School's accreditation webpage.