PUBLIC HEALTH, BIOSTATISTICS (PHST)

Subject-area course lists indicate courses currently active for offering at the University of Louisville. Not all courses are scheduled in any given academic term. For class offerings in a specific semester, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm).

500-level courses generally are included in both the undergraduate- and graduate-level course listings; however, specific course/section offerings may vary between semesters. Students are responsible for ensuring that they enroll in courses that are applicable to their particular academic programs.

Course Fees

Some courses may carry fees beyond the standard tuition costs to cover additional support or materials. Program-, subject- and course-specific fee information can be found on the Office of the Bursar website (http://louisville.edu/bursar/tuitionfee/).

PHST 200. Reasoning with Data in Daily Life - QR 3 Units
Term Typically Offered: Spring Only
Prerequisite(s): Appropriate ACT Math placement score or successful completion of GEN 103 or equivalent coursework.
Description: This course seeks to develop in students a competency in problem-solving and analysis, which will be necessary for them to succeed in college and throughout their lives and career. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

PHST 301. Quantitative Methods in Public Health 3 Units
Term Typically Offered: Fall, Spring
Prerequisite(s): PHST 200, or MATH 109, or MATH 111 or higher, or Global Health minor.
Description: The course is an introduction to the concepts and theory behind quantitative analysis methods used in public health. The content focuses on how and why different statistical methods are used with minimal emphasis on statistical calculations. The skills of critical thinking, communication, and teamwork are promoted and cultivated throughout this course. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

PHST 302. Intermediate Statistical Analysis 3 Units
Term Typically Offered: Spring Only
Prerequisite(s): PHST 301, or equivalent introductory statistics course including MATH 109, SOC 301, PSYC 301, PAS 408 etc.
Description: This course is an intermediate level applied statistics course covering key aspects of data exploration, visualization, and traditional topics in statistical inference, this course will utilize the statistical package SPSS, with a focus on understanding how to use and interpret SPSS output. This course is intended to give students familiarity with statistical tools used to analyze data in a variety of disciplines - including economics, marketing, management, education, sociology, psychology, neuroscience, biology, mathematics, physics, environmental science, engineering, computer science, finance, health services administration, and public health - to be better prepared to pose relevant statistical questions, apply appropriate statistical techniques, and effectively interpret and communicate results.
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PHST 310. Applied Statistical Regression Models 3 Units
Term Typically Offered: Fall Only
Prerequisite(s): PHST 302.
Description: This is the first course of statistical regression models in public health practice. The covered topics are: normal distribution, t-distribution, hypothesis testing, inference for two or more population means, one-way and two-way analysis of variance (ANOVA), linear regression with one or more independent variables, inferential and diagnostic methods in regression and correlation, multiple regression analysis; model building in regression; factorial experiments, and design of experiments. When relevant, examples related to population health issues are utilized.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

PHST 315. Sports Statistics 3 Units
Term Typically Offered: Summer Only
Prerequisite(s): PHST 301 or equivalent (MATH 109, SOC 301, PSYC 301, and PAS 408) and MATH 111.
Description: Sabermetrics and "moneyball" have highlighted the use of statistics and mathematics in making sports decisions. In this course, we will consider how to use statistical tools to approach a variety of questions in traditional sports including baseball, football, and basketball. We will use methods from statistics such as probability, correlation, regression, and expected values to make predictions and compare game strategies. We will discuss the mathematics of several common approaches for evaluating players and teams.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)
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| PHST 421    | Statistical Computing in R                          | 3     | Spring Only            | **Prerequisite(s):** PHST 302.  
**Description:** This course introduces students to the software R for statistical analysis. The R language provides a rich environment for statistical modeling and computing. The course emphasis is on practical issues in statistical computing which includes the basic syntax of R, programming in R, inputting and outputting (I/O) data in R, writing R functions, debugging, profiling R code, generating R packages, and running basic statistical analysis with R. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm) |
| PHST 431    | The Principles of Statistical Learning              | 3     | Spring Only            | **Prerequisite(s):** PHST 301, or equivalent (MATH 109, SOC 301, PSYC 301, and PAS 408).  
**Description:** This introductory course gives an overview of many concepts, techniques, and algorithms in Statistical learning, including the topics related to regression, classification, dimension reduction. The course will give the student the basic ideas and intuition behind modern statistical learning methods as well as a bit more formal understanding of how, why, and when they work. The underlying theme in the course is statistical inference as it provides the foundation for most of the methods covered. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm) |
| PHST 440    | Statistical Study Design and Research Methods       | 3     | Fall Only              | **Prerequisite(s):** PHST 302.  
**Description:** This course introduces multiple designs of studies that are commonly used in various disciplines, such as the clinical trials in pharmaceutical studies, the case-control study and cohort study in observational research methods. The research methods associated with those designs will also be discussed. In addition, this course will review some of the fundamental concepts and basic methods in survival analysis. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm) |
| PHST 500    | Introduction to Biostatistics for Health Sciences I  | 3     | Fall Only              | **Prerequisite(s): Enrolled as a student in the PH MPH, MSc or Certificate in Clinical Investigation Sciences program.**  
**Description:** An introduction to descriptive and inferential statistical methods, including descriptive and graphical methods, estimation, calculation of confidence intervals, and 1- and 2-sample hypothesis testing, one-way analysis of variance (ANOVA), and simple linear regression. The R statistical software environment will be used to introduce data management and descriptive and inferential statistical methods.  
**Note:** Students interested in this course that do not meet the stated prerequisites should contact the department of Bioinformatics and Biostatistics. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm) |
| PHST 501    | Introduction to Biostatistics for Health Sciences II | 3     | Spring Only            | **Prerequisite(s):** PHST 500.  
**Description:** This course is a continued graduate level introduction to inferential statistical methods, covering multi-way analysis of variance, multiple regression, the chi-square analysis of frequencies and logistic regression, survival analysis, and nonparametric statistical methods. A statistical software package will be used to execute the descriptive, graphical, and inferential statistical techniques on real data sets. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm) |
| PHST 520    | Statistical Computing and Data Management with SAS   | 3     | Spring Only            | **Prerequisite(s):** PHST 301, or equivalent (MATH 109, SOC 301, PSYC 301, and PAS 408).  
**Description:** This course will introduce students to the software R for statistical analysis. The R language provides a rich environment for statistical analysis. The course emphasis is on practical issues in statistical computing which includes the basic syntax of R, programming in R, inputting and outputting (I/O) data in R, writing R functions, debugging, profiling R code, generating R packages, and running basic statistical analysis with R. A statistical software package will be used to execute the descriptive, graphical, and inferential statistical techniques on real data sets. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm) |
| PHST 561    | Mathematical Tools I                                | 1     | Summer Only            | **Prerequisite(s):** Conditional or full admission to the MS or Certificate in Biostatistics programs.  
**Description:** This course covers mathematical tools required for sound comprehension of mathematical probability and statistics concepts included in methodological portions of coursework in the MS in Biostatistics degree. Course topics include: (1) functions and graphs with particular focus on polynomials and roots, rational functions, and exponential and logarithmic functions, and (2) limits and continuity of functions. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm) |
| PHST 562    | Mathematical Tools II                               | 1     | Summer Only            | **Prerequisite(s):** Conditional or full admission to the MS or Certificate in Biostatistics programs.  
**Description:** This course covers mathematical tools required for sound comprehension of mathematical probability and statistics concepts included in methodological portions of coursework in the MS in Biostatistics degree. Course topics include: (1) functions and graphs with particular focus on polynomials and roots, rational functions, and exponential and logarithmic functions, and (2) limits and continuity of functions. For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm) |
PHST 563. Mathematical Tools III  1 Unit
Term Typically Offered: Summer Only
Prerequisite(s): Conditional or full admission to the MS or Certificate in Biostatistics programs.
Description: This course covers mathematical tools required for sound comprehension of mathematical probability and statistics concepts included in methodological portions of coursework in the MS in Biostatistics degree. Course topics include: (1) multivariable functions, limits, and continuity, (2) partial differentiation and its applications, and (3) multiple integration and its applications.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

PHST 564. Mathematical Tools IV  1 Unit
Term Typically Offered: Summer Only
Prerequisite(s): Conditional or full admission to the MS or Certificate in Biostatistics programs.
Description: This course covers mathematical tools required for sound comprehension of mathematical probability and statistics concepts included in methodological portions of coursework in the MS Biostatistics degree. Course topics include (1) vector/matrix algebra and operations, (2) solving systems of linear equations, (3) vector spaces, linear independence, rank, and basis, (4) eigenvalues and eigenvectors, (5) orthogonal vectors and projections, (6) quadratic forms.
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