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 (https://csprd.louisville.edu/psp/ps_class/EMPLOYEE/PSFT_CS/c/COMMUNITY_ACCESS.CLASS_SEARCH./x/?state=62dab551a0d600a5e8237359c50704e59007&duo_code=sjUx2OSTj21bWV5nQ37Yb)

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 (https://louisville.edu/bursar/tuitionfee/university-fees/).

PHST 200. Reasoning with Data in Daily Life - QR   **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): Appropriate placement score or equivalent coursework.
Description: Refer to the UofL Accuplacer Testing website for more details (https://louisville.edu/testing/placement-testing-math-reading). 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 higher MATH course.
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.
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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 statisical 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 disciples - 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, PYSC 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.
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PHST 421. Statistical Computing in R　3 Units
Term Typically Offered: 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 Units
Term Typically Offered: 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.
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PHST 440. Statisitical Study Design and Research Methods　3 Units
Term Typically Offered: 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 trails in pharmaceutical studies, the case-control study and cohort study in observational research methods. The research methods associated with those designs will also he discussed. In addition, this course will review some of the fundamental concepts and basic methods in survival analysis.
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PHST 500. Introduction to Biostatistics for Health Sciences I　3 Units
Term Typically Offered: 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.

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PHST 501. Introduction to Biostatistics for Health Sciences II　3 Units
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 Units
Term Typically Offered: Spring Only
Prerequisite(s): PHST 301, or equivalent (MATH 109, SOC 301, PSYC 301, PAS 408).
Description: This course will introduce students to the fundamental of data management and analysis using SAS. It will give an overview of the SAS system under MS Windows and provide a fundamental grounding in the data step and Base SAS procedure. We will cover elementary statistical analyses such as measures of location and spread, correlation, detection of outliers, graphical displays, comparison of groups, as well as additional specialized studies.
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PHST 561. Mathematical Tools I　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) functions and graphs with particular focus on polynomials and roots, rational functions, and exponential and logarithmic functions, and (2) limits and continuity of functions.
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PHST 562. Mathematical Tools II　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) first and higher order differentiation of single variable functions and techniques for differentiation, (2) applications of differentiation including identification of minima, maxima, and inflection points, (3) antiderivatives, the definite integral, and the Fundamental Theorem of Calculus, (4) techniques of integration including substitution, integration by parts, etc.; using integrals to compute areas, and (5) sequences and series, convergence of each, partial and infinite sums, geometric series, Taylor series.
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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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