# Biostatistics Competencies

## M.S. in Biostatistics

| Graduates of the MS in Biostatistics will be able to: | Primarily Gained through These Required Courses | Secondarily Gained through These Elective or Other Required Courses |
|---|---|---|
| Demonstrate a broad knowledge and understanding of current statistical theory, methods, and practices in the health sciences. | BIOS:5710 Biostatistical Methods I<br>BIOS:5720 Biostatistical Methods II<br>BIOS:5730 Biostatistical Methods in Categorical Data<br>BIOS:6610 Statistical Methods in Clinical Trials<br>STAT:4100 Mathematical Statistics I<br>STAT:4101 Mathematical Statistics II<br>STAT:5100 Statistical Inference I<br>STAT:5101 Statistical Inference II<br>EPID:4400 Epidemiology I: Principles | BIOS:6210 Applied Survival Analysis<br>BIOS:6310 Introductory Longitudinal Data Analysis<br>BIOS:6420 Survey Design and Analysis<br>BIOS:6650 Casual Inference<br>BIOS:6810 Bayesian Methods and Design<br>BIOS:7110 Theory of Biostatistics I<br>BIOS:7120 Theory of Biostatistics II<br>BIOS:7210 Survival Data Analysis<br>BIOS:7310 Longitudinal Data Analysis<br>BIOS:7320 Advanced Clinical Trials<br>BIOS:7410 Analysis of Categorical Data<br>STAT:4520 Bayesian Statistics |
| Effectively collaborate on a research team. | BIOS:5510 Biostatistical Computing<br>BIOS:5720 Biostatistical Methods II<br>BIOS:5730 Biostatistical Methods in Categorical Data<br>BIOS:6610 Statistical Methods in Clinical Trials<br>BIOS:7500 Preceptorship in Biostatistics | BIOS:6210 Applied Survival Analysis<br>BIOS:6310 Introductory Longitudinal Data Analysis<br>BIOS:7270 Scholarly Integrity in Biostatistics |
| Develop statistical designs and implement analyses for health science investigations. | BIOS:5720 Biostatistical Methods II<br>BIOS:5730 Biostatistical Methods in Categorical Data<br>BIOS:6610 Statistical Methods in Clinical Trials<br>BIOS:7500 Preceptorship in Biostatistics | BIOS:6210 Applied Survival Analysis<br>BIOS:6310 Introductory Longitudinal Data Analysis |
| Develop computer programs for the management and analysis of data sets. | BIOS:5510 Biostatistical Computing<br>BIOS:5710 Biostatistical Methods I<br>BIOS:5720 Biostatistical Methods II<br>BIOS:5730 Biostatistical Methods in Categorical Data | BIOS:6210 Applied Survival Analysis<br>BIOS:6310 Introductory Longitudinal Data Analysis<br>BIOS:6420 Survey Design and Analysis |
| Prepare reports and publications resulting from health science studies. | BIOS:5710 Biostatistical Methods I<br>BIOS:5720 Biostatistical Methods II<br>BIOS:5730 Biostatistical Methods in Categorical Data<br>BIOS:6610 Statistical Methods in Clinical Trials<br>BIOS:7500 Preceptorship in Biostatistics | BIOS:6210 Applied Survival Analysis<br>BIOS:6310 Introductory Longitudinal Data Analysis<br>BIOS:7270 Scholarly Integrity in Biostatistics |
| Effectively communicate key statistical principles to a non-statistical audience. | BIOS:5710 Biostatistical Methods I<br>BIOS:5720 Biostatistical Methods II<br>BIOS:5730 Biostatistical Methods in Categorical Data<br>BIOS:6610 Statistical Methods in Clinical Trials<br>BIOS:7500 Preceptorship in Biostatistics | BIOS:6210 Applied Survival Analysis<br>BIOS:6310 Introductory Longitudinal Data Analysis<br>BIOS:6420 Survey Design and Analysis<br>BIOS:7270 Scholarly Integrity in Biostatistics |

## Ph.D. in Biostatistics

| Graduates of the PhD in Biostatistics will be able to: | Primarily Gained through These Required Courses | Secondarily Gained through These Elective or Other Required Courses |
|---|---|---|
| Master MS competencies | See previous page | |
| Demonstrate an increased level of knowledge and understanding of current statistical theory, methods, and practices in the health sciences. | BIOS:7110 Theory of Biostatistics I<br>BIOS:7120 Theory of Biostatistics II<br>BIOS:7210 Survival Data Analysis<br>BIOS:7310 Longitudinal Data Analysis<br>BIOS:7410 Analysis of Categorical Data<br>STAT:7200 Linear Models | BIOS:6650 Casual Inference<br>BIOS:6720 Statistical Machine Learning for Biomedical & Public Health Data<br>BIOS:6810 Bayesian Methods and Design<br>BIOS:7320 Advanced Clinical Trials<br>BIOS:7600 Advanced Biostatistics Seminar<br>STAT:7520 Bayesian Statistics<br>STAT:7400 Computer Intensive Statistics |
| Develop new statistical methods. | BIOS:7900 Dissertation | BIOS:7600 Advanced Biostatistics Seminar |
| Design, manage data, analyze and interpret data from a variety of experimental and observational studies. | BIOS:7210 Survival Data Analysis<br>BIOS:7310 Longitudinal Data Analysis<br>BIOS:7410 Analysis of Categorical Data<br>BIOS:7500 Preceptorship in Biostatistics | BIOS:6650 Casual Inference<br>BIOS:6720 Statistical Machine Learning for Biomedical & Public Health Data<br>BIOS:6810 Bayesian Methods and Design<br>BIOS:7320 Advanced Clinical Trials<br>BIOS:7600 Advanced Biostatistics Seminar<br>STAT:7520 Bayesian Statistics |
| Communicate research findings, including new statistical methods developed, effectively to various audiences in writing and through oral presentation. | BIOS:7210 Survival Data Analysis<br>BIOS:7310 Longitudinal Data Analysis<br>BIOS:7410 Analysis of Categorical Data<br>BIOS:7500 Preceptorship in Biostatistics<br>BIOS:7900 Dissertation | BIOS:6650 Casual Inference<br>BIOS:6720 Statistical Machine Learning for Biomedical & Public Health Data<br>BIOS:6810 Bayesian Methods and Design<br>BIOS:7320 Advanced Clinical Trials<br>BIOS:7600 Advanced Biostatistics Seminar<br>STAT:7520 Bayesian Statistics |

## MPH-Quantitative Methods Subtrack

| In addition to mastering the core competencies, graduates of the MPH in Quantitative Methods will be able to: | Primarily Gained through These Required Courses | Secondarily Gained through These Elective or Other Required Courses |
|---|---|---|
| Demonstrate a broad knowledge and understanding of statistical techniques used in public health studies and investigations. | BIOS:4120 Introduction to Biostatistics<br>BIOS:5120 Regression Modeling and ANOVA in the Health Sciences<br>BIOS:6110 Applied Categorical Data Analysis<br>BIOS:5710 Biostatistical Methods I<br>BIOS:5720 Biostatistical Methods II<br>BIOS:5730 Biostatistical Methods in Categorical Data | BIOS:5310 Research Data Management<br>BIOS:5510 Biostatistical Computing<br>BIOS:6210 Applied Survival Analysis<br>BIOS:6310 Introductory Longitudinal Data Analysis<br>BIOS:6650 Comparative Effectiveness Research Methods for Observational Data<br>BIOS:6610 Statistical Methods in Clinical Trials<br>BIOS:7270 Scholarly Integrity in Biostatistics<br>STAT:3100 Intro to Mathematical Statistics I<br>STAT:3101 Intro to Mathematical Statistics II |
| Serve as an advocate for good statistical design in public health investigations | | |
| Apply appropriate statistical methods for inference about public health related questions, and describe the results to public health professionals and educated lay audiences. | | |
| Interpret the results of statistical analyses in public health related publications for public health professionals and educated lay audiences. | | |
| Promote the use of sound statistical methods to answer open questions in public health practice. | | |
| Function as a collaborator on public health projects, taking a leadership role in the design and implementation of projects. | MPH:7000 MPH Practicum Experience | (Graduate Research Assistantship) |
| Assume responsibility for the design and implementation of analyses in investigations of public health questions. | BIOS:5710 Biostatistical Methods I<br>BIOS:5720 Biostatistical Methods II<br>BIOS:6110 Applied Categorical Data Analysis<br>MPH:7000 MPH Practicum Experience | BIOS:6210 Applied Survival Analysis<br>BIOS:6310 Introductory Longitudinal Data Analysis |
| Manage the data for public health related projects such as large community surveys, laboratory investigations, and multi-center clinical trials | BIOS:5510 Biostatistical Computing | BIOS:5310 Research Data Management<br>BIOS:6610 Statistical Methods in Clinical Trials |
| Demonstrate effective written and oral communication skills when communicating quantitative information and statistical inferences to different audiences of public health professionals | BIOS:4120 Introduction to Biostatistics<br>BIOS:5120 Regression Modeling and ANOVA in the Health Sciences<br>BIOS:6110 Applied Categorical Data Analysis<br>BIOS:5710 Biostatistical Methods I<br>BIOS:5720 Biostatistical Methods II<br>BIOS:5730 Biostatistical Methods in Categorical Data<br>MPH:7000 MPH Practicum Experience | BIOS:6210 Applied Survival Analysis<br>BIOS:6310 Introductory Longitudinal Data Analysis<br>(Graduate Research Assistantship) |