# Biostatistics – ScM
# Department of Biostatistics

## 1. Design research studies of human health and disease

| Specific Competencies | Learning Opportunities | | Evaluation Opportunities: Course Work/Exam | Written Comps | Thesis |
|---|---|---|---|---|---|
| Acquire knowledge and skills in research methodologies to collaborate with substantive investigators | 140.646-9 | Essentials of Probability and Statistical Inference I-IV | X | X | X |
| | 140.651-4 | Methods in Biostatistics I-IV | | | |
| | 260.600 | Introduction to the Biomedical Sciences | | | |
| | 306.665 | Research Ethics and Integrity | | | |
| | 340.751-3 | Epidemiologic Methods 1-3 | | | |
| | 550.860 | Research Ethics | | | |
| | Biostatistics Grand Rounds and Seminar Series | | | | |
| | Thesis | | | | |
| Choose appropriate health outcomes, risk factors, and covariates | 140.651-4 | Methods in Biostatistics I-IV | X | X | X |
| | 260.600 | Introduction to the Biomedical Sciences | | | |
| | 340.751-3 | Epidemiologic Methods 1-3 | | | |
| | Biostatistics Grand Rounds and Seminar Series | | | | |
| | Thesis | | | | |
| Make sample size estimates so that studies have sufficient power to achieve their aims | 140.646-9 | Essentials of Probability and Statistical Inference I-IV | X | X | X |
| | 140.651-4 | Methods in Biostatistics I-IV | | | |
| | Thesis | | | | |

## 2. Gain facility with one or more statistical packages

| Specific Competencies | Learning Opportunities | | Evaluation Opportunities: Course Work/Exam | Written Comps | Thesis |
|---|---|---|---|---|---|
| Have facility with one or more major statistical packages (SAS, R, or Stata) | 140.646-9 | Essentials of Probability and Statistical Inference I-IV | X | X | X |
| | 140.651-4 | Methods in Biostatistics I-IV | | | |
| | 140.776 | Statistical Computing | | | |
| | Thesis | | | | |

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### 3. Design and implement tabular and graphical displays if quantitative information

| Specific Competencies | Learning Opportunities | | Evaluation Opportunities: Course Work/Exam | Written Comps | Thesis |
|---|---|---|---|---|---|
| Use statistical software to generate efficient and appropriate visual and tabular displays of data | 140.646-9<br>140.651-4<br>140.776<br>Thesis | Essentials of Probability and Statistical Inference I-IV<br>Methods in Biostatistics I-IV<br>Statistical Computing | X | X | X |
| Recognize good graphical displays and poor graphical displays of data | 140.651-4<br>340.751-3<br>Biostatistics Grand Rounds and Seminar Series<br>Thesis | Methods in Biostatistics I-IV<br>Epidemiologic Methods 1-3 | X | X | X |

### 4. Draw inferences from quantitative data

| Specific Competencies | Learning Opportunities | | Evaluation Opportunities: Course Work/Exam | Written Comps | Thesis |
|---|---|---|---|---|---|
| Correctly use biostatistical reasoning and methods | 140.646-9<br>140.651-4<br>Biostatistics Grand Rounds and Seminar Series<br>Thesis | Essentials of Probability and Statistical Inference I-IV<br>Methods in Biostatistics I-IV | X | X | X |
| Use linear and generalized linear models for regression analysis | 140.646-9<br>140.651-4<br>Biostatistics Grand Rounds and Seminar Series<br>Thesis | Essentials of Probability and Statistical Inference I-IV<br>Methods in Biostatistics I-IV | X | X | X |
| Present oral and written reports of results of statistical analyses | 140.646-9<br>140.651-4<br>Biostatistics Grand Rounds and Seminar Series<br>Thesis | Essentials of Probability and Statistical Inference I-IV<br>Methods in Biostatistics I-IV | X | X | X |

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### 5. Perform a major statistical analysis to address a public health or statistical research question

| Specific Competencies | Learning Opportunities | | Evaluation Opportunities: Course Work/Exam | Written Comps | Thesis |
|---|---|---|---|---|---|
| Frame the scientific question in terms of a statistical model | 140.646-9<br>140.651-4<br>340.751-3<br>Biostatistics Grand Rounds and Seminar Series<br>Thesis | Essentials of Probability and Statistical Inference I-IV<br>Methods in Biostatistics I-IV<br>Epidemiologic Methods 1-3 | X | X | X |
| Estimate unknown parameters and confidence intervals and make appropriate tests of null hypotheses | 140.646-9<br>140.651-4<br>340.751-3<br>Biostatistics Grand Rounds and Seminar Series<br>Thesis | Essentials of Probability and Statistical Inference I-IV<br>Methods in Biostatistics I-IV<br>Epidemiologic Methods 1-3 | X | X | X |
| Correctly interpret statistical findings in scientific terms | 140.646-9<br>140.651-4<br>340.751-3<br>Biostatistics Grand Rounds and Seminar Series<br>Thesis | Essentials of Probability and Statistical Inference I-IV<br>Methods in Biostatistics I-IV<br>Epidemiologic Methods 1-3 | X | X | X |
| Summarize findings in written or oral presentations | 140.646-9<br>140.651-4<br>340.751-3<br>Biostatistics Grand Rounds and Seminar Series<br>Thesis | Essentials of Probability and Statistical Inference I-IV<br>Methods in Biostatistics I-IV<br>Epidemiologic Methods 1-3 | X | X | X |

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### 6. Use statistical reasoning and theory to deal effectively with non-standard statistical problems

| Specific Competencies | Learning Opportunities | Evaluation Opportunities: Course Work/Exam | Written Comps | Thesis |
|---|---|---|---|---|
| Solve new problems by analogy to other problems with known solutions | 140.646-9 Essentials of Probability and Statistical Inference I-IV<br>140.651-4 Methods in Biostatistics I-IV<br>Biostatistics Grand Rounds and Seminar Series<br>Thesis | X | X | X |
| Determine statistical properties of a novel estimator using delta method or nonparametric methods such as bootstrapping | 140.646-9 Essentials of Probability and Statistical Inference I-IV<br>140.651-4 Methods in Biostatistics I-IV<br>Biostatistics Grand Rounds and Seminar Series<br>Thesis | X | X | X |

### 7. Assist statistical researchers in the conduct of original, methodologic research

| Specific Competencies | Learning Opportunities | Evaluation Opportunities: Course Work/Exam | Written Comps | Thesis |
|---|---|---|---|---|
| Illustrate statistical methods and theory with analysis of public health data | Thesis | | | X |

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### 8. Develop a public health perspective on research

| Specific Competencies | Learning Opportunities | | Evaluation Opportunities: Course Work/Exam | Written Comps | Thesis |
|---|---|---|---|---|---|
| Identify the development of human health across the lifespan; the major root and proximate cause of morbidity and mortality; and the most effective strategies for promoting health and preventing disease and disability in a population | 260.600<br>550.865 | Introduction to the Biomedical Sciences<br>Public Health Perspectives on Research | X | | |
| Identify the scientific methods used in public health research and practice | 260.600<br>340.751-3<br>550.865<br>Thesis | Introduction to the Biomedical Sciences<br>Epidemiologic Methods 1-3<br>Public Health Perspectives on Research | X | X | X |
| Effectively translate statistical ideas and concepts to public health collaborators | 140.651-4<br>260.600<br>306.665<br>340.751-3<br>550.860<br>550.865<br>Thesis | Methods in Biostatistics I-IV<br>Introduction to the Biomedical Sciences<br>Research Ethics and Integrity<br>Epidemiologic Methods 1-3<br>Research Ethics<br>Public Health Perspectives on Research | X | | X |