BIOSTATISTICS, MASTER OF SCIENCE (M.S.) WITH A CONCENTRATION IN CLINICAL RESEARCH AND BIOSTATISTICS

Program goal
The mission of the VCU Department of Biostatistics is to improve human health through methodological research, the education of graduate students and health science researchers in biostatistical methods and applications, and collaborative health sciences research. Faculty members conduct methodological research motivated by collaborative alliances, which in turn contributes to and enhances the department’s educational mission. By focusing on the integration of methodological and collaborative research, students develop strong biostatistical and communication skills, enabling them to assume leadership positions in academia, government and industry.

Student learning outcomes
1. Experimental design: Students will demonstrate the achievement of an appropriate level of competence in the ability to appraise, modify and/or create, and implement experimental protocols and to design and develop experiments as measured by rubric.
2. Integrated knowledge of statistics and bioscience: Students will demonstrate an appropriate level of knowledge of the current elements of statistics as related to bioscience and a more detailed understanding of the individual area of scholarship, including an appropriate familiarity with the research literature and the ability to evaluate and critique publications as measured by rubric.
3. Oral communication skills: Students will demonstrate the achievement of an appropriate level of oral communication skills with respect to the content, organization, logical flow, presentation and appropriate use of language incorporating the use of visual aids, as measured by rubric.
4. Problem-solving skills: Students will demonstrate an appropriate level of skill in the identification and selection of meaningful problems to be addressed in bioscience research, including the ability to defend said identifications and to design and develop appropriate methods to solve said problems as measured by rubric.
5. Written communication skills: Students will demonstrate the achievement of an appropriate level of written communication skill with respect to grammar, syntax, spelling and use of vocabulary to effectively present information including the use of figures, tables and citations as measured by rubric.

VCU Graduate Bulletin, VCU Graduate School and general academic policies and regulations for all graduate students in all graduate programs
The VCU Graduate Bulletin website documents the official admission and academic rules and regulations that govern graduate education for all graduate programs at the university. These policies are established by the graduate faculty of the university through their elected representatives to the University Graduate Council.

It is the responsibility of all graduate students, both on- and off-campus, to be familiar with the VCU Graduate Bulletin as well as the Graduate School website and academic regulations in individual school and department publications and on program websites. However, in all cases, the official policies and procedures of the University Graduate Council, as published on the VCU Graduate Bulletin and Graduate School websites, take precedence over individual program policies and guidelines.

Visit the academic regulations section for additional information on academic regulations for graduate students.

Degree candidacy requirements
A graduate student admitted to a program or concentration requiring a final research project, work of art, thesis or dissertation, must qualify for continuing master’s or doctoral status according to the degree candidacy requirements of the student’s graduate program. Admission to degree candidacy, if applicable, is a formal statement by the graduate student’s faculty regarding the student’s academic achievements and the student’s readiness to proceed to the final research phase of the degree program.

Graduate students and program directors should refer to the following degree candidacy policy as published in the VCU Graduate Bulletin for complete information and instructions.

Visit the academic regulations section for additional information on degree candidacy requirements.

Graduation requirements
As graduate students approach the end of their academic programs and the final semester of matriculation, they must make formal application to graduate. No degrees will be conferred until the application to graduate has been finalized.

Graduate students and program directors should refer to the following graduation requirements as published in the Graduate Bulletin for a complete list of instructions and a graduation checklist.

Visit the academic regulations section for additional information on graduation requirements.

Other information
School of Medicine graduate program policies
The School of Medicine provides policies applicable to all programs administratively housed in the school. Information on master’s programs is available elsewhere in this chapter of the Graduate Bulletin.

Apply online at graduate.admissions.vcu.edu (http://www.graduate.admissions.vcu.edu).

Admission requirements

<table>
<thead>
<tr>
<th>Degree</th>
<th>Semester(s) of entry</th>
<th>Deadline dates</th>
<th>Test requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.S.</td>
<td>Fall preferred</td>
<td>Applications received prior to Jan 15</td>
<td>GRE</td>
</tr>
</tbody>
</table>

In addition to the general admission requirements of the VCU Graduate School (http://bulletin.vcu.edu/graduate/study/admission-graduate-study/admission-requirements), students applying to the clinical
research and biostatistics concentration must hold the M.D., D.D.S., Ph.D., D.P.H., D.O., Pharm.D. or an equivalent health professional terminal degree from an accredited college or university. Applicants with international M.D. degrees are considered on an individual basis. The applicant must have a minimum undergraduate GPA of 3.00. Applicants must also submit a letter detailing career goals and how the M.S. in Biostatistics with a concentration in clinical research and biostatistics applies to those goals, as well as at least three letters of recommendation.

**Degree requirements**

In addition to the general VCU Graduate School graduation requirements (http://bulletin.vcu.edu/academic-regs/grad/graduation-info), M.S. in Biostatistics, clinical research and biostatistics concentration students must complete a minimum total of 34 graduate credit hours. This includes 17 credit hours of core course work, 12 credit hours of elective courses and at least five credit hours of directed independent research. Students in the clinical research and biostatistics concentration must complete a research project, culminating in an academic manuscript submitted for publication. A research advisory committee must be formed to direct the student’s research project. The research advisory committee must consist of two clinicians familiar with the student’s area of research and a faculty member of the Department of Biostatistics. The student is be primarily responsible for the conceptualization, design, conduct, analysis and interpretation of the research project.

**Final examination**

Clinical research and biostatistics concentration students do not defend their research projects at a final oral examination.

**Curriculum requirements**

<table>
<thead>
<tr>
<th>Core courses</th>
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</thead>
<tbody>
<tr>
<td>BIOS 516</td>
<td>Biostatistical Consulting</td>
</tr>
<tr>
<td>BIOS 531</td>
<td>Clinical Epidemiology</td>
</tr>
<tr>
<td>or EPID 571</td>
<td>Principles of Epidemiology</td>
</tr>
<tr>
<td>BIOS 543</td>
<td>Graduate Research Methods I</td>
</tr>
<tr>
<td>or STAT 543</td>
<td>Statistical Methods I</td>
</tr>
<tr>
<td>BIOS 544</td>
<td>Graduate Research Methods II</td>
</tr>
<tr>
<td>or STAT 544</td>
<td>Statistical Methods II</td>
</tr>
<tr>
<td>BIOS 571</td>
<td>Clinical Trials</td>
</tr>
<tr>
<td>BIOS 572</td>
<td>Analysis of Biomedical Data I</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>1</td>
</tr>
<tr>
<td>OVPR 601</td>
<td>Scientific Integrity</td>
</tr>
<tr>
<td>OVPR 602</td>
<td>Responsible Scientific Conduct</td>
</tr>
<tr>
<td>OVPR 603</td>
<td>Responsible Conduct of Research</td>
</tr>
</tbody>
</table>

**Directed research**

- BIOS 697 Directed Research in Biostatistics (minimum five credits) 5

**Electives**

Select 12 credits from the suggested electives below 12

**Total graduate credit hours required (minimum) 34**

**Suggested electives**

**Electives in biostatistics**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOS 524</td>
<td>Biostatistical Computing</td>
<td>3</td>
</tr>
<tr>
<td>BIOS 549</td>
<td>Spatial Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BIOS 553</td>
<td>Biostatistical Methods I</td>
<td>4</td>
</tr>
<tr>
<td>BIOS 554</td>
<td>Biostatistical Methods II</td>
<td>4</td>
</tr>
<tr>
<td>BIOS 573</td>
<td>Analysis of Biomedical Data II</td>
<td>3</td>
</tr>
<tr>
<td>BIOS 610</td>
<td>Research Processes and Methods for the Health Professions</td>
<td></td>
</tr>
<tr>
<td>BIOS 691</td>
<td>Special Topics in Biostatistics</td>
<td>1-4</td>
</tr>
</tbody>
</table>

**Electives in epidemiology and public health**

- EPID 571 Principles of Epidemiology 3
- EPID 600 Introduction to Public Health 3
- EPID 601 Contemporary Issues and Controversies in Public Health 3
- EPID 603 Public Health Policy and Politics 3
- EPID 606 Epidemiologic Methods 3
- EPID 607 Nutritional Epidemiology 3
- EPID 620 Cancer Epidemiology 3
- EPID 648 Behavioral Epidemiology 3

**Electives in social and behavioral health**

- SBHD 605 Introduction to Social and Behavioral Health 3
- SBHD 610 Behavioral Measurement 3
- SBHD 632 Health Disparities and Social Justice 3
- SBHD 633 Structural Equation Modeling 3

**Typical plan of study**

Many students often end up taking more than the minimum number of hours required for a degree program. The total number of hours may vary depending upon the program, nature of research being conducted by a study or in the enrollment or funding status of the student. Students should refer to their program websites and talk with their graduate program directors or advisers for information about typical plans of study and registration requirements.

**Graduate program director**

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(804) 828-3047

**Additional contact** (admissions and prospective students)

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(804) 827-2049

**Program website**: biostatistics.vcu.edu (http://www.biostatistics.vcu.edu)