MASTER OF SCIENCE IN APPLIED STATISTICS AND ANALYTICS

The Master of Science in Applied Statistics and Analytics is offered by the Department of Biostatistics (http://catalog.ku.edu/medicine/biostatistics) located at the University of Kansas Medical Center (http://www.kumc.edu). This program is offered 100% online through the University of Kansas-Edwards campus (http://edwardscampus.ku.edu/about-ku-edwards-campus). Graduates are equipped with hands-on statistical computing skills emphasizing proper application and problem solving and are prepared for careers in the rapidly growing fields of statistics, biostatistics and data analytics. Many of the most employable graduate degrees (http://membercentral.aaas.org/blogs/driving-force/statistics, biostatistics and data analytics. Many of the most employable graduate degrees) involve statistics.

All coursework can be completed online, providing flexibility for working professionals who want to increase their knowledge of statistics and analytics. In response to workforce demand for knowledge and skills in data analytics and statistics, students enrolled in this degree program may choose from one of two areas of emphasis:

- **Data Analytics Emphasis** will provide graduates with experience working with and analyzing large datasets using several of the most common statistical software tools.
- **Statistics Emphasis** will provide hands-on statistical computing in the context of statistical methods commonly applied in industry and government agencies.

**Characteristics of Graduates**

Upon completion of the MS in Applied Statistics and Analytics, the student should be prepared to immediately function as a statistician and/or analyst. Therefore the student must have an understanding of the statistical theory underlying the methods most in-demand in the workforce, and should be proficient in the application of statistical methods within their field. Graduates of this program should be able to:

1. Demonstrate an understanding of statistical theory and practice.
2. Function as a collaborator on a project team.
3. Demonstrate proficiency in industry-standard statistical software.
4. Assume responsibility for the design and implementation of analyses for projects within his or her field.
5. Assist with the design and implementation of data management systems for projects within his or her field of application.
6. Prepare reports and publications resulting from said projects.
7. Effectively communicate the principles of statistics and analytics with his or her peers with varying statistical backgrounds.
8. Serve as an advocate for good statistical design and practice.

The application process for the M.S. in Applied Statistics and Analytics is an online process. Detailed instructions on how to apply are posted on the Department of Biostatistics (http://www.kumc.edu/school-of-medicine/department-of-biostatistics/biostatistics-graduate-program/)

prospective-students/admissions-procedure.html) website. Students may be admitted to begin the fall, spring or summer semester.

**Admission requirements:**

- A bachelor’s degree from a regionally accredited institution documented by submission of an official transcript indicating the degree has been conferred before entering the program. Official transcripts from institutions attended post-baccalaureate are also required.
- Students with degrees from outside the U.S. may be subject to transcript evaluation indicating the degree is equivalent to a U.S. degree and meets the minimum cumulative GPA requirements.
- A cumulative grade-point average (GPA) of at least 3.0 on a 4.0 scale for the bachelor’s degree.
- Applicants who are not native speakers of English, whether domestic or international, must demonstrate they meet the Minimum English Proficiency Requirement (http://www.kumc.edu/Documents/graduate%20students/Min%20Engl%20Prof%2016-Oct.pdf).
- A background check is required during the admission process; it may affect the student’s eligibility to enter the program.
- Successful completion with a B average or higher of Calculus I and II (i.e. single variable differentiation and integration or equivalent).
- Completion of Calculus III (i.e. multivariable) is preferred but not required.
- Successful completion of a course in any computer programming language, certification of completion of training in a programming language, or demonstrated work experience.
- Three letters of recommendation from a faculty member, advisor, employer or other person familiar with the applicant’s work and character. The recommendations may not be obtained from family members, friends, etc.
- A personal statement describing your career goals and your interest in the program.
- A current resume or curriculum vitae listing scholarships/fellowships, awards and history of employment.

An official copy of the Graduate Record Examination (GRE) score (or other graduate examination scores, such as the GMAT) are recommended. Scores should be sent directly from the testing provider to the University of Kansas Medical Center. Applicants will be assessed based on these requirements. Students not meeting the above requirements may be eligible for provisional admission. After an applicant has been admitted, the program may defer an applicant’s admission for one year after which time the applicant must submit a new application.

Admission requirements are subject to change. In most cases, use the catalog of the year student entered the program. Other years’ catalogs». The M.S. in Applied Statistics and Analytics degree program consists of 30 credit hours. Student’s choose an emphasis area in either data analytics or statistics. Each emphasis area consists of a common foundation of 15 credit hours of statistics courses in addition to the 6 credit hours specific to the emphasis and 9 credit hours of related elective hours. Students complete an ethics and research component through completion of the foundation courses.

**Degree requirements:**

- Degree requirements are normally completed within 2 years of admission to the program although a maximum of 7 years is allowed.
• Completion of a minimum of 30 credit hours.

• Cumulative grade-point average (GPA) of at least a 3.0 for all KU graduate coursework.

• No more than two grades of C are allowed in courses required for the degree.

• Enrollment in a minimum of one credit hour the semester the student will graduate.

• Successful completion of a general examination (http://www.kumc.edu/Documents/graduate%20studies/Masters%20Exam-Defense%2016-Oct.pdf) the semester the student will graduate. This is a comprehensive examination that is administered during the final semester of enrollment after successful completion of the required methods coursework including STAT 820, STAT 830, and STAT 871. The examination has two purposes: 1) to assess the student’s strengths and weaknesses and 2) to determine whether the student should be awarded the MS degree. The examination is created and administered by a committee of at least three members of the Department Graduate Faculty. If this examination is failed, subject to committee approval, a second examination may be taken no sooner than three months later. The committee can recommend that the student leave the program following the semester in which the examination is taken. After two failures, no further examination is permitted and the student will not be awarded the degree.

• Successful completion of the following courses:

  - Foundation courses (minimum of 15 credit hours.)
    - STAT 805  Professionalism, Ethics and Leadership in the Statistical Sciences  3
    - STAT 820  Statistical Computing/SAS Base L1  3
    - STAT 830  Experimental Design  3
    - STAT 840  Linear Regression  3
    - STAT 871  Mathematical Statistics  3
    Total Hours: 15

  - Emphasis courses (minimum of 6 credit hours.)
    Data Analytics Emphasis (6)
    - STAT 823  Introduction to Programming and Applied Statistics in R  3
    or STAT 850  Multivariate Statistics
    or STAT 855  Statistical Methods in Genomics Research
    - STAT 880  Data Mining and Analytics  3
    Statistics Emphasis (6)
    - STAT 835  Categorical Data Analysis  3
    or STAT 845  Survival Analysis
    or STAT 825  Nonparametric Methods
    or STAT 850  Multivariate Statistics
    Total Hours: 12

  - Elective courses (minimum of 9 credit hours.) Specific courses are determined in consultation with the student's advisor.
    - Successful completion of a minimum of 6 credit hours of elective coursework selected from master level statistics courses offered by the department.
    - Successful completion of a minimum of 3 credit hours of elective coursework. Any course taken for elective credit external to the department must be approved by the department’s curriculum committee for the master's programs.

Degree requirements and course descriptions are subject to change. Any courses taken as an equivalent must be approved by the Graduate Director and the Office of Graduate Studies. In most cases, use the catalog of the year student entered the program. Other years' catalogs.«

Annual Evaluations:
Students are evaluated each May by their faculty advisor and Program Chair. These evaluations provide feedback to the student regarding the progress that they are making toward the degree.

Typical Plan of Study
Students may choose to pursue one of two emphasis areas for the MS in Applied Statistics and Analytics degree. The emphasis areas were developed based on the knowledge and skillset demanded by the workforce.

• Data Analytics Emphasis will provide graduates with experience working with and analyzing large datasets using several of the most common statistical software tools.

• Statistics Emphasis will provide hands-on statistical computing in the context of statistical methods commonly applied in industry and government agencies.

Below is the typical plan of study based on which emphasis is chosen.

Analytics Emphasis for MS in Applied Statistics and Analytics
Year 1

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>STAT 820</td>
<td>3</td>
<td>STAT 830</td>
<td>3</td>
<td>STAT 805</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>STAT 840</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
<td>STAT 823 or 833</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>BIOS 871</td>
<td>3</td>
<td>STAT 880</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Hours: 30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Statistics Emphasis for MS in Applied Statistics and Analytics
Year 1

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>STAT 820</td>
<td>3</td>
<td>STAT 830</td>
<td>3</td>
<td>STAT 805</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>STAT 840</td>
<td>3</td>
<td>STAT 825 (or Elective)</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Master of Science in Applied Statistics and Analytics

Year 2

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 835</td>
<td>3</td>
<td>STAT 845 or</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>825</td>
<td></td>
</tr>
<tr>
<td>STAT 871</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>General Exam may be scheduled beginning of the Spring semester if approved by advisor to proceed.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Hours: 30

Because the MS in Applied Statistics and Analytics degree signifies that the holder is prepared for entry into the practice of applied statistics research, it follows that graduates must have the knowledge and skills necessary to function in a broad range of academic and research situations. The Technical Standards include those physical, cognitive, and behavioral standards that are required for the satisfactory completion of all aspects of the curriculum and the development of professional attributes required by all students at graduation. Therefore, the following abilities and expectations must be met by all students with or without accommodations admitted to the MS program:

1. **Observation.** A student must be able to observe and evaluate class demonstrations and field experiences relevant to the field of statistics. He or she must be able to read and comprehend text, numbers, tables and graphs, both in print and displayed electronically. Observation necessitates the functional use of the senses of vision and hearing.

2. **Communication.** A student must be able to communicate effectively and efficiently in English in oral, written, and electronic form with other students, faculty, staff, researchers, and the public. Effective communication includes: the ability to understand assigned readings, lectures, and technical and professional materials; the ability to analyze information, the ability to present results of such analyses verbally and in writing; the ability to independently prepare papers and presentations; and the ability to follow verbal and written instructions. Use of computers and other technology is imperative to this communication.

3. **Motor.** A student must have sufficient motor function to attend classes, prepare assignments, use electronic media, deliver lectures and make public presentations. Class requirements may also include field work in a variety of collaborative environments.

4. **Intellectual, conceptual, integrative and quantitative abilities.** A student must possess the ability to understand and read and understand documents written in English, to understand and work with measurements and calculations, and to engage in reasoning, analysis, synthesis and critical thinking. A student must be able to exercise sufficient judgment to recognize and correct performance deviations, and be able to draw on all the above mentioned abilities to be an effective problem solver, researcher, and communicator.

5. **Behavioral and social attributes.** A student must have the emotional health required for the full use of his or her intellectual ability. A student must be able to exercise sound judgment, and to act ethically and with integrity. He or she must develop mature, sensitive, and effective professional relationships with others. A student must be self-motivated, reliable and responsible to complete assigned tasks in a timely manner with no supervision. Students must be able to give attention to detail and have the flexibility to function in a research setting, including adapting to changes in time, place and structure of academic and research settings. The student must have the ability to work with diverse groups.

**NOTE:** Reasonable accommodations will be considered and may be made to qualified students who disclose a disability, so long as such accommodation does not significantly alter the essential requirements of the curriculum and the training program. Students who disclose that they have a disability are considered for the program if they are otherwise qualified. Qualified students with a disability who wish to request accommodations should provide the appropriate documentation of disability and submit a request for accommodation to the University's Office for Academic Accommodations.