**WCU Master of Science in Applied Statistics Course Overview**

Below is an overview of the progression of Applied Statistics courses:

In [**STA511**](https://www.wcupa.edu/sciences-mathematics/mathematics/gradstat/511.aspx) and **STA503**, first semester MS students learn the basic computer programming skills necessary for statistical analysis of data, namely by learning SAS and R. SAS is the software used by pharmaceutical and many other industrial companies. R is also commonly used in a wide variety of companies and institutions for many applications. By learning the basics of these software programs in the first semester, MS students can utilize these skills for data analysis in all subsequent courses. In subsequent classes, students will then be able to learn statistical computing techniques concurrently with the theory and purpose of more complex statistical techniques

First year MS students also study mathematical statistics. In [**STA505**](https://www.wcupa.edu/sciences-mathematics/mathematics/gradstat/505.aspx) and [**STA506**](https://www.wcupa.edu/sciences-mathematics/mathematics/gradstat/506.aspx), students study the underlying theory of the material taught in the degree program. Thus, even after just one semester, students have an understanding of theoretical statistics and computer programming and are ready to delve into advanced statistical topics using real-life examples. **STA504** covers the same material as **STA505**, but has an extra hour each week devoted to review of important calculus topics important to statistics.

After completing the core classes in the first year (STA503, STA504/505, STA506, STA511, and STA512), students have the opportunity to take two or three electives chosen from a wide range of important and timely topics. Please refer to the [**Degree Program Requirements**](https://www.wcupa.edu/sciences-mathematics/mathematics/gradstat/documents/Advising%20Sheets_updated_2020.docx)document on our website to find which electives are part of each concentration and the side panel displays syllabi for all of these courses.

Courses such as[**STA512**](https://www.wcupa.edu/sciences-mathematics/mathematics/gradstat/512.aspx), [**STA507**](https://www.wcupa.edu/sciences-mathematics/mathematics/gradstat/507.aspx), and [**STA513**](https://www.wcupa.edu/sciences-mathematics/mathematics/gradstat/513.aspx) give students the skills required to design experiments and perform analysis on the kind of data found in real-life settings. In each of these classes, critical thinking skills as related to statistical analyses are emphasized. Moreover, each class strongly emphasizes the ability to effectively communicate complex statistical ideas to non-statisticians. Students are evaluated on their ability to communicate data analysis results and to justify the choice of analysis, through both written reports and oral presentations. Additionally, role-playing scenarios are utilized to train students to communicate effectively in a statistical consulting situation.

[**STA514**](https://www.wcupa.edu/sciences-mathematics/mathematics/gradstat/514.aspx) is a culmination of the classroom portion of the program, as students gain experience in critically reading journal articles with regard to their statistical content. Many of the procedures introduced in preceding classes will be reinforced through practical applications. Again, the skills developed in this class will be those highly valued by potential employers.

[**STA531**](http://catalog.wcupa.edu/search/?P=STA+531) is a Special Topics course that changes annually. It is designed to teach students about areas that are of current interest in Applied Statistics, but not covered in depth in other courses. Past and potential topics include data mining, survival analysis, statistical genetics, database marketing, time series, and non-parametric methods. Members of local industry may teach or co-teach STA531 courses.

MS students also have the opportunity to get hands-on experience working with statisticians and scientists by taking [**STA601**](http://catalog.wcupa.edu/search/?P=STA+601) and participating in an internship with a local company. Upon completion of their internships, students write a summary report and present the results of their research to program faculty. Recent students have completed internships at companies such as AstraZeneca, Chase, Citibank, Endo Pharmaceuticals, GlaxoSmithKline, Incyte, Merck, QVC, University of Pennsylvania School of Medicine, Stroud Water Research Center, and many others.

[**STA609**](http://catalog.wcupa.edu/search/?P=STA+609) and [**STA610**](http://catalog.wcupa.edu/search/?P=STA+610) give thesis-track students the opportunity to conduct supervised research in an area of interest. The thesis may address any topic approved by the [Program Director](mailto:rrieger@wcupa.edu), including exploration of a new statistical theory or application of a statistical model to a new problem. The thesis may be interdisciplinary and involve work with professors from multiple departments.  A student may extend his or her thesis work over more than one semester if needed. Thesis credits cannot be used as a substitute for other required course credits.

The Certificate Program in Applied Statistics requires 19 hours of coursework but does not include the mathematical theory classes included in the MS program.