Statistics-VISP Electives Offered in Fall 2025

All Statistics-VISP students must take 6 credits of undergraduate elective courses listed below. **Given the limited space, students cannot enroll in more than 6 credits of electives.**

It may not be possible to switch undergraduate electives, so please make sure that you are thoughtful in your choice. Course descriptions are available online in the MSDS Graduate Guide [at this link].

- STAT 303 R for Statistics I (1 cr), STAT 304 R for Statistics II (1 cr), STAT 305 R for Statistics III (1 cr)
  - Stats-VISP students must enroll in either LEC 002 or 004
  - Students who have no prior experience with R are strongly recommended to take these three courses
- STAT 349 LEC 002 Introduction to Time Series (3 cr)
- STAT 421 LEC 002 Applied Categorical Data Analysis (3 cr)
- STAT 436 LEC 002 Statistical Data Visualization (3 cr)
- STAT 451 LEC 002 Introduction to Machine Learning and Statistical Pattern Classification (3 cr)
- STAT 453 LEC 002 Introduction to Deep Learning and Generative Models (3 cr)
- STAT 461 LEC 002 Financial Statistics (3 cr)
- STAT 471 LEC 002 Introduction to Computational Statistics (3 cr)
  - STAT 471 introduces students to the field of computational statistics. Entering students are expected to be familiar with basic features of probability and statistical inference; the broad goal of 471 is to reinforce and enrich these concepts by addressing them from the perspective of computation.
  - The course has three goals: (1) to study algorithms that implement various inference calculations, (2) to gain experience with compute-intensive inference methods, (3) to practice deploying statistical calculations in the context of the R language and environment. Topics will be drawn from numerical analysis, numerical linear algebra, convex analysis, optimization, graph theory, and Monte Carlo methods. Data and statistical models from contemporary scientific areas will be used to animate the technical discussion.
- STAT 479 LEC 002 Sports Analytics (3 cr)
  - In addition to the usual data wrangling, model building, and visualization, the course will involve a **lot** more writing than other Statistics courses. The learning outcomes include building a portfolio of written reports summarizing different analyses (which they could share with potential employers…), communicating effectively with technical and non-technical audiences, and providing feedback to and receiving feedback from their peers.
  - Most of the worked examples will use data from American football, basketball, baseball, and hockey. These are the sports with the most (and highest quality) publicly available data. There may be opportunities for students to look at data from other sports. No background knowledge of or interest in any specific sport(s) will be presumed; however, students are expected to be willing to learn about and engage with data from sports that they don't necessarily like.
  - Topics related to (daily) fantasy sports or sports betting will **not** be covered.
- STAT 479 LEC 004 Topological Data Analysis (3 cr)

    - This course will provide an introduction to topological data analysis (TDA), which is a set of computational topology tools that may be used in the analysis of data for tasks such as visualization, inference, or prediction. The primary focus is on *persistent homology*, which can be thought of as characterizing *holes* in data. What are holes in data? Great question! We will discuss this more rigorously, but you can think of zero-dimensional holes as connected components, one-dimensional holes as loops, two-dimensional holes as voids, etc. It may be hard to believe that where the data are not located (i.e., the holes), can provide useful information and insights for inference or prediction, but it has been successfully used in a variety of applications including astronomy, brain artery trees, cell biology, histology images, morphology, among many others. Various theoretical, methodological, computational, and applied aspects of persistent homology will be discussed during the semester.
- STAT 575 LEC 002 Statistical Methods for Spatial Data (3 cr)

As a Statistics-VISP student, it is exceptionally important that you pay attention to the sections that you are enrolling into. The designated sections (noted by "Lecture 00x") are for Stats-VISP & MSDS students. The other sections are for Statistics undergraduate students, so you should only enroll in the sections designated for Stats-VISP & MSDS students.