

# HEALTH DATA SCIENCE (HDS)

## HDS 5130 - Healthcare Organization, Management, and Policy

**Credit(s): 3 Credits**

The course is designed to give students frameworks, analytic tools, informational resources, and specialized expertise in health administration and health policy. This background will prepare students for professional work in the health sector in medical and health settings, as researchers, managers or program developers, or as professionals responsible for analysis, evaluation, or advocacy. The course emphasizes knowledge of the organization and financing of health care, politics, the influence of Medicare and Medicaid policies, and the implications of health policy for diverse populations. The course will particularly focus on the implications of the recently enacted health reform – the Patient Protection and Affordable Care Act (ACA) of 2010. Offered in spring.

## HDS 5210 - Programming for Health Data Scientists

**Credit(s): 3 Credits**

Students will be introduced to concepts in computer programming using the Python programming language. Students will learn to conceptualize steps required to perform a task, manipulate files, create loops, and functions. By the end of this course, students will have a basic understanding of computer programming, a working knowledge of the Python programming language, and they will be able to share their scripts to collaborate with other team members.

## HDS 5230 - High Performance Computing

**Credit(s): 3 Credits**

This course is needed to give Health Data Science students the skills they will need to work with big healthcare data and modern high-performance computing environments during their careers.

**Prerequisite(s):** HDS 5310; HDS 5210

## HDS 5310 - Analytics and Statistical Programming

**Credit(s): 3 Credits** (Repeatable for credit)

This course will serve as the foundation for all subsequent coursework. Students will learn statistical concepts of probability theory, sampling theory, null hypothesis significance testing, and Bayesian estimation. They will develop expertise in the R statistical programming language and Markdown syntax, and learn to collaborate with one another using the git and github version-tracking/sharing tools. By the end of this course, students will have a basic knowledge of statistical concepts, be able to execute analyses in R, share work with collaborators, and document their results.

## HDS 5320 - Inferential Modeling

**Credit(s): 3 Credits**

Students will learn to conceptualize research questions as statistical models, and parameterize those models from real-world data. The course will start by introducing the linear model, then expand into generalized linear models, nonlinear models, mixed and multilevel models, and Cox survival models. Students will have a working knowledge of how to use statistical models to gain an understanding of the influence of individual predictor variables on health outcomes.

**Prerequisite(s):** HDS 5310

## HDS 5330 - Predictive Modeling and Machine Learning

**Credit(s): 3 Credits**

In contrast to the statistical modeling course which focuses on understanding the influence of variables on outcomes, this course will focus on predicting individual health outcomes using modern automated model development algorithms. By the end of this course, students will be able to create predictive analytics using popular machine learning packages in R and Python.

## HDS 5930 - Special Topics

**Credit(s): 3 Credits** (Repeatable for credit)

## HDS 5960 - Capstone Experience

**Credit(s): 3 Credits**

This course is designed to offer data science students an opportunity to practice their skills in an industry setting, to learn the roles that various members of a data science team play in an organization, and to begin building a network of professional contacts and references.

**Prerequisite(s):** ORES 5300; HDS 5210; HDS 5310

**Restrictions:**

Enrollment limited to students in the HDS11 program.

## HDS 5980 - Independent Study

**Credit(s): 1 or 3 Credits** (Repeatable for credit)