

# Programming & Coding Courses

## **BIOS 6640 R for Data Science 3.0 cr.**

Restriction: Offered in variable terms and years. Credit will only be given for one of the following courses: BIOS 6640 or EPID 6605

Statistical programming in R, including data management, subscripting, loops, functions, packages, graphics. Concepts and methods for reproducible research will be covered as well as computationally intensive statistical methods. These methods are used to analyze data and present results.

## **BIOS 6642 Introduction to Python Programming 3.0 cr.**

Restriction: Offered in variable terms and years. Credit will only be given for either this course or BIOS 6682. This first course in programming using Python covers basic concepts such as variables, data types, iteration, flow of control, input/output, and functions and advanced concepts such as object oriented programming. Statistics related examples, homework and projects may be used.

## **BIOS 6644 Practical Data Wrangling 2.0 cr.**

Restriction: Offered variable terms and years.

Data Wrangling is the process of getting data into a format which is useful for science. This course will provide students with a diverse set of tools, strategies and practices which can dramatically reduce the pain and wasted time often associated with wrangling and how to leverage the innumerable free resources available to everyone.

## **BIOS 6660 Analysis of Genomic Data using R and Bioconductor 3.0 cr.**

Prereq/Coreq: BIOS 6602 or BIOS 6612, or consent of instructor. Restriction: Offered in variable terms and years. This course provides students with hands on experience in solving real life biological problems using the statistical software R and Bioconductor. Students will work and communicate with participating researchers and clinicians on their case studies of genomics data.

## **BIOS 7747 Machine Learning for Biomedical Applications 3.0 cr.**

Prereq: Biostatistical methods (e.g. BIOS 6611, BIOS 6612), linear algebra (e.g. MATH 3191) and Python programming (e.g. BIOS 6642), or permission of instructor. Restriction: Offered in variable terms and years. This course is intended for MS and PhD students.

Theoretical background of unsupervised and supervised machine learning methods and their application to biomedical problem solving. In addition to understanding methodological details, student will learn how to use and apply machine learning methods in Python and improve their coding skills.

## **BIOS 7719 Information Visualization 3.0 cr.**

Cross-listed with CPBS 7719. Prereq: BIOS 6611 and BIOS 6612 or permission of instructor. Proficiency coding in a language suitable for developing interactive visualizations. Restriction: Offered in variable terms and years.

Information visualization studies interactive visualization techniques for analyzing abstract data. This course introduces design, development, and validation approaches with applications in various biological and biomedical domains.