BIOINFORMATICS/ COMPUTATIONAL BIOLOGY (BCB)

BCB 4040 (s) Special Topics (1-16 credits, max 99, max arranged)

BCB 4200 Foundations of Data Visualization (3 credits)
Joint-listed with BCB 5200
This class will help students establish a foundational understanding of data visualization. We will consider how data type (including tabular, network, and spatial data) interacts with visualization task to guide design choices. Diverse types of visual encodings and how they relate to human perception will be presented, along with practical exercises using the R programming language. Upon completion of the course, students will understand why particular visualization approaches are effective for a given data set and how to implement those visualizations using R. The course is designed to be "discipline agnostic": each student is encouraged to use data sets that they deem important/interesting. The goal is to have students learn how to develop visualizations that are relevant to their own disciplinary interests. Additional projects/ assignments required for graduate credit. Typically Offered: Spring.
Prereqs: STAT 2510 or INTR 5090

BCB 5000 Master's Research and Thesis (1-16 credits, max 99)
Credit arranged

BCB 5010 (s) Seminar (1-16 credits, max 99)
Credit arranged. Students are required to attend all of the invited speaker presentations in the IBEST/CMCI/BCB seminar series for the semester they are enrolled. Students who miss one or more presentations are expected to attend an alternative seminar approved by the instructor. Additional meetings may be required by the instructor.

BCB 5020 (s) Directed Study (1-16 credits, max 99)
Credit arranged

BCB 5030 (s) Workshop (1-16 credits, max 99)
Credit arranged

BCB 5040 (s) Special Topics (1-16 credits, max 99)
Credit arranged.

BCB 5060 Laboratory Experience in the Biological Sciences (1-16 credits, max 99)
Credit arranged. Hands-on activities in an active research laboratory whose central research interests are in the biological or biochemical sciences.
Prereqs: Admission to BCB program.

BCB 5070 Laboratory Experience in the Computational Sciences (1-16 credits, max 99)
Credit arranged. Hands-on activities in an active research laboratory whose central research interests are in the computational sciences.
Prereqs: Admission to BCB program.

BCB 5080 Laboratory Experience in Mathematics or Statistics (1-16 credits, max 99)
Credit arranged. Hands-on activities in an active research laboratory whose central research interests are in the mathematics or statistics.
Prereqs: Admission to BCB program.

BCB 5200 Foundations of Data Visualization (3 credits)
Joint-listed with BCB 4200
This class will help students establish a foundational understanding of data visualization. We will consider how data type (including tabular, network, and spatial data) interacts with visualization task to guide design choices. Diverse types of visual encodings and how they relate to human perception will be presented, along with practical exercises using the R programming language. Upon completion of the course, students will understand why particular visualization approaches are effective for a given data set and how to implement those visualizations using R. The course is designed to be "discipline agnostic": each student is encouraged to use data sets that they deem important/interesting. The goal is to have students learn how to develop visualizations that are relevant to their own disciplinary interests. Additional projects/ assignments required for graduate credit. Typically Offered: Spring.

BCB 5210 Communicating with Data (2 credits)
Students are taught writing and presentation skills to improve their communication of data-driven insights to specialist and lay audiences. The course emphasizes reproducible research practices, including literate programming (Quarto / Markdown) and version control (GitHub). Course content includes the conceptual foundations of communicating with data along with written and verbal assignments using data sets individualized to each student's interest. Typically Offered: Spring.
Prereqs: INTR 5090 or BS degree

BCB 5220 Data Science Portfolio (1 credit)
This course provides feedback, review, and approval of the student's online data science portfolio. This portfolio is intended to represent the body of work accumulated by the student over the course of the certificate in Professional Applications of Data Science. It should contain examples of novel data products (such as FAIR data sets), analyses, and visualizations. All elements of the portfolio will be hosted online (likely in a GitHub repository or professional website), be open source, and demonstrate best practices of literate programming and reproducible research. Typically Offered: Varies.
Prereqs: INTR 5090 or BS degree

BCB 5240 (s) Data Carpentries (1-2 credits, max 6)
Cross-listed with AVFS 5240
This series of hands-on workshops will cover basic concepts and tools for processing data and reproducibly performing data analyses. This includes spreadsheet management, program design, data visualization in R and Python, and task automation in Unix, R, or Python, depending on the session. We will cover best practices for collecting and organizing data to streamline data processing and statistical analyses. Participants will be encouraged to help one another and to apply what they have learned to their own research problems. The course is aimed at graduate students and other researchers that are working with scientific data but is open to undergraduate students with instructor permission. Graded Pass/Fail. Typically Offered: Fall and Spring.
Prereqs: Senior or graduate status, or instructor permission.

BCB 5970 (s) Practicum (1-16 credits, max 99)
Credit arranged

BCB 5980 (s) Internship (1-16 credits, max 99)
Credit arranged

BCB 5990 (s) Non-thesis Master's Research (1-16 credits, max 99)
Credit arranged

BCB 6000 Doctoral Research and Dissertation (1-45 credits, max 99)
Credit arranged