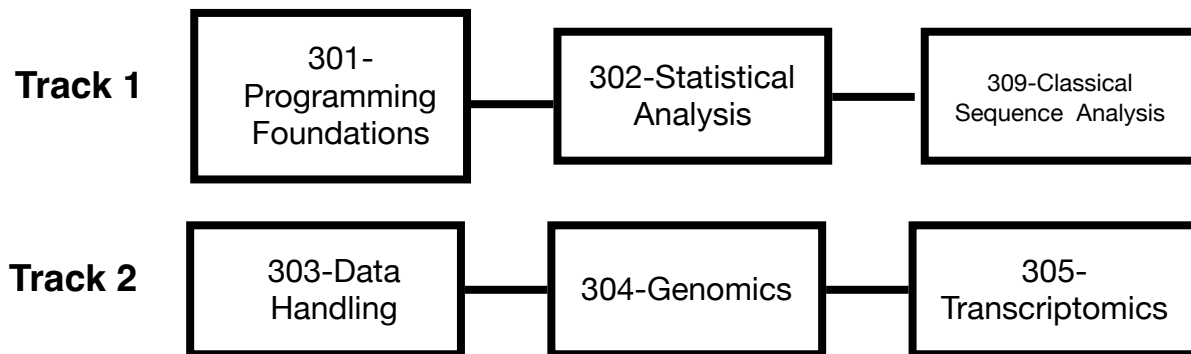


Fall 2023 CMSE Bioinformatics Modular Courses



CMSE890:301-Programming Foundations for Bioinformatics

This course is for absolute beginners to programming. Topics include using R/R-Studio, data structures, control structures, external packages, tidying data, text mining, and making publishable figures/documents. No prerequisite. August 30 - September 27.

CMSE890:302-Statistical Analysis and Visualization of Biological Data

This course is for students with minimal statistics background. Topics include summary statistics, probability distributions, confidence intervals, P-values, Type I/II errors, ANOVA, regression, and PCA. Prerequisite: CMSE890:301. October 4 - November 1.

CMSE890:303-Data Handling: Unix and Python

This course is for students with huge data files. Topics include Unix on the MSU HPCC, bash scripting, job management, basic Python, and Jupyter Notebooks. No prerequisite but CMSE890:301 suggested. September 5 - September 28.

CMSE890:304-Intro to Genomics

This course is for beginners in genomic data analysis. Topics include sequencing technologies, quality control, read alignment/validation, variant detection, and genome assembly. Prerequisite: CMSE890:303 or equivalent. October 5 - November 2.

CMSE890:305-Transcriptomic Data Analysis

This course is for beginners in RNA-Seq. Topics include alignment, expression quantification, differential gene expression, pathway enrichment, and network analysis. Prerequisites: CMSE890:302 and 304 or equivalents. November 9 - December 7.

CMSE890:309-Classical Sequence Analysis

This course is for beginners in basic sequence analysis. Topics include BLAST, substitution matrices, Hidden Markov models, multiple sequence alignment, phylogenetic trees, and combining sequence with structure. Prerequisites: CMSE890:302 or equivalent. November 8 - December 6.

Track 1 meets Mondays and Wednesdays from 3:00-4:50pm. Track 2 meets Tuesdays and Thursdays from 3:00-4:50pm. Courses will be hybrid with Zoom options available for all class sessions.

See website for course details: [**https://cmse.msu.edu/academics/bioinformatics-program/**](https://cmse.msu.edu/academics/bioinformatics-program/)

Send questions to Bioinformatics Program Coordinator Alexis Black Pyrkosz ([**ablackpz@msu.edu**](mailto:ablackpz@msu.edu))