



**University of California, Riverside  
ENVIRONMENTAL STATISTICS**

Course Number: ENSC 110

Quarter: Fall (2019–2020 academic year)

Units: 4 (Lecture: 3 hours; Laboratory: 3 hours)

Lecture: MWF 9:00 AM – 9:50 AM (Sci Labs 301)

Laboratory: W 4:00 PM – 6:50 PM (Sproul 2225)

**Topics covered in Fall 2019**

(Note: R will be used instead of Matlab starting from Academic Year 2020/2021)

**Matrix algebra**

Definitions of row/column vectors and  $N \times M$  matrices, matrix multiplication, transposes, determinants, cofactors, inverse, identity matrices.

**Matlab programming**

Storing data as vectors and matrices in Matlab, matrix operations, matrix multiplication versus elementwise multiplication, plotting, input/output files, logics and loops, Fibonacci sequence, Bisection method.

**Summary statistics**

Sample mean, sample standard deviation, standard error of sample mean, Central Limit Theorem, weighted mean, weighted standard deviation, weighted standard error, deseasonalization of climate data

**Hypothesis testing**

Generating random number using Lehman's scheme, verifying the Central Limit Theorem by Monte Carlo simulation, testing  $H_0$  and  $H_1$  hypotheses using Monte Carlo simulation and Bootstrap resampling, testing the toxicity of the environment

**Linear methods**

Linear/quadratic/Lagrange interpolation, system of linear equations, Gaussian elimination, linear matrix equations, linear/non-linear regression, least-squares minimization.