AMS 580: Statistical Learning

Department of Applied Mathematics & Statistics, SBU

1. Course Description:

This course will first review classical linear and generalized linear models such as Linear Regression, Logistic Regression, and Linear Discriminant Analysis. We shall then study modern Resampling Methods such as Bootstrapping, and modern variable selection methods such as the Shrinkage Method. We will study traditional multivariate analysis methods including cluster analysis, principal component analysis, and multivariate regression methods such as structural equation modeling. Finally, we shall introduce modern non-linear statistical learning methods such as the Generalized Additive Models, Decision Trees, Random Forest, Boosting, Bagging, Support Vector Machines, and Neural Networks.

2. Textbooks:


3. Class Time, Instructor & TA Office Hours:

Lectures: Tuesday/Thursday 8:00am-9:20am

Professor Wei Zhu ([wei.zhu@stonybrook.edu](mailto:wei.zhu@stonybrook.edu));
Tuesday/Thursday 3:30pm-4:30pm
Zoom link for Prof. Zhu Office Hours: [https://stonybrook.zoom.us/my/profweizhu?pwd=RjVIVXg3YUhudzZZQ3pheiUydTJBUT09](https://stonybrook.zoom.us/my/profweizhu?pwd=RjVIVXg3YUhudzZZQ3pheiUydTJBUT09)
Mr. Weihao Wang (Ian) (weihao.wang@stonybrook.edu); Tuesday/Thursday 12:10pm-1:10pm

* Please see Blackboard for Zoom links to lectures & TA office hours
4. Grading:

*Final course score = maximum (cumulative score, final exam at 100%)

Cumulative Score:

1. Team Project: 20%
2. Quizzes: 20%
3. Midterm (Tuesday, March 30, during class): 30%
4. Final Exam (Thursday, May 13, 8:00-10:45am): 30%

Note: This course is offered every Spring semester. The quizzes, midterm and final exam are open book exams. The students will perform various analyses using methods taught in class on data sets provided or simulated during the exam. The required programming language is R that will be taught throughout the course. Some questions in these tests are more theoretical in nature and will require derivations. Each student must work on his/her exam independently – for all the exams and quizzes.

5. Required Syllabus Statements

The University Senate Undergraduate and Graduate Councils have authorized that the following required statements appear in all teaching syllabi (graduate and undergraduate courses) on the Stony Brook Campus.

Student Accessibility Support Center Statement
If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Student Accessibility Support Center, ECC (Educational Communications Center) Building, Room 128, (631) 632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

Academic Integrity Statement
Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at
Critical Incident Management
Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.

Student Absences Statement
Students are expected to attend every class, report for examinations and submit major graded coursework as scheduled. If a student is unable to attend lecture(s), report for any exams or complete major graded coursework as scheduled due to extenuating circumstances, the student must contact the instructor as soon as possible. Students may be requested to provide documentation to support their absence and/or may be referred to the Student Support Team for assistance. Students will be provided reasonable accommodations for missed exams, assignments or projects due to significant illness, tragedy or other personal emergencies. In the instance of missed lectures or labs, the student is responsible for making up the lectures (including: review posted slides, review recorded lectures, and make up the missing homework). Please note, all students must follow Stony Brook, local, state and Centers for Disease Control and Prevention (CDC) guidelines to reduce the risk of transmission of COVID. For questions or more information click here.