**Syllabus**

1. **Course Name Course Number Credit Hours**

**Statistical Learning STA 4235 3**

1. **Course prerequisites**

**STA 4234 or Equivalent**

1. **Instructor**

Name: Lianfen Qian, Office SE 244

Phone: (561) 297-2486, fax (561) 297-2436

E-mail: lqian@fau.edu

1. **Course description**

This is an introductory-level course in supervised learning with a focus on regression and classification methods. The course will help students to understand basic concepts, ideas, and methods in statistical learning. Considerable amount of effort will also be put on computational aspects of algorithm implementation.

1. **Course objectives**

 Students who complete this course will be able to:

* Explain statistical learning methodology.
* Explain the assumptions of various techniques such as Multiple Regression, Discriminant Analysis, Logistic Regression, Decision Trees, and Cluster Analysis.
	+ Build multiple regression, discriminant analysis, and logistic models for forecasting.
	+ Validate models using statistical tests.
	+ Interpret and understand decision trees and random forests.
	+ Discuss issues of implementation of the results of various techniques
	+ Develop methods to monitor the ongoing performance of implemented models.
1. **Lecture Schedule**
* Introduction to Statistical Learning (ca. 1 week)
* Linear Regression and Classification (ca. 1 week)
* Logistic Regression (ca. 1 week)
* Linear Discriminant Analysis (ca. 1 week)
* Resampling Methods (ca 1 weeks)
* Linear Model Selection and Regularization (ca. 2 weeks)
* Moving Beyond Linearity (ca. 2 weeks)
* Tree-based Methods (ca. 2 week)
* Support Vector Machines (ca. 1 week)
* Unsupervised Learning (ca. 2 week)
* Project Presentations (ca. 1 week)
1. **Required Text**

Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani (2013), *An Introduction to Statistical Learning with Applications in R,* First Edition, Springer.

(ISBN: 978-1-4614-7137-0)

1. **Assessment Procedure and Grading**

There will be six take-home homework assignments accounting for 30% of your cumulative performance, four in-class quizzes accounting for 20% of your cumulative performance, a midterm exam accounting for 20% of your cumulative performance, and a final project that accounts for 30% of your cumulative performance. Your overall grade in the course is derived from your cumulative performance according to the following table.

|  |  |
| --- | --- |
| **Cumulative Performance**  | **Grade**  |
| > 93%  | A  |
| > 90% – 93%  | A−  |
| > 87% – 90%  | B+  |
| > 83% – 87%  | B  |
| > 80% – 83%  | B−  |
| > 77% – 80%  | C+  |
| > 73% – 77%  | C  |
| > 70% – 73%  | C−  |
| > 67% – 70%  | D+  |
| > 63% – 67%  | D  |
| ≥ 60% – 63%  | D−  |
| <60%  | F  |

1. **Incomplete Grades**

A grade of *I* (incomplete) will only be given under certain conditions and in accordance with the academic policies and regulations put forward in FAU’s *University Catalog*. The student has to show exceptional circumstances why requirements cannot bet met. A request for an incomplete grade has to be made in writing with supporting documentation, where appropriate.

1. **Makeup Tests and Extra Credit**

If you cannot attend an exam or hand in a homework project in time due to a relevant reason like significant health problems or being involved in a major traffic accident, and you document this, then you can make up the respective assignment.

1. **Method of Instruction**

The course is conducted in lectures combined with lab sessions. Assignments may require the use of a statistical software package R.

1. **Disability policy statement**

In compliance with the Americans with Disabilities Act (ADA), students who require special accommodations due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) located in Boca Raton - SU 133 (561-297-3880), in Davie - MOD I (954-236-1222), in Jupiter - SR 117 (561-799-8585), or at the Treasure Coast - CO 128 (772-873-3305), and follow all OSD procedures.

1. **Honor Code policy statement**

Students at Florida Atlantic University are expected to maintain the highest ethical standards.  Academic dishonesty, including cheating and plagiarism, is considered a serious breach of these ethical standards, because it interferes with the University mission to provide a high quality education in which no student enjoys an unfair advantage over any other.  Academic dishonesty is also destructive of the University community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility.  Harsh penalties are associated with academic dishonesty.  For more information, see University Regulation 4.001 at <http://www.fau.edu/ctl/4.001_Code_of_Academic_Integrity.pdf>