RADI 6054
Introduction to Statistical Learning
Fall, 2021

CLASS DAYS and TIME: Mondays, 14:00- 16:00

CLASSROOM: All classes will be conducted interactively over Zoom

COURSE FACULTY: Geoffrey Clarke

OFFICE LOCATION and HOURS: please schedule with instructors

EMAIL: clarkeg@uthscsa.edu

TELEPHONE: 210-567-8114

READ THIS DOCUMENT CAREFULLY - YOU ARE RESPONSIBLE FOR ITS CONTENTS.

COURSE DESCRIPTION AND OBJECTIVES

Introduction to magnetic resonance imaging from the prospective of advanced user. This course is designed to give the student a conceptual understanding of MRI equipment, process of image formation and research applications of MRI. Hands-on sessions are included to improve the student’s understanding of materials covered in class.

Pre-requisites – RADI 5007 or equivalent

Semester credit hours – 2 CU

At the end of the course, the student shall have:

- apply a fundamental knowledge of NMR physics to understanding the magnetic resonance imaging processes.
- discuss the concepts underlying various technologies used for magnetic resonance imaging.
- recount clinical and research applications of magnetic resonance imaging.

COURSE ORGANIZATION

The main teaching modalities used in this course include:

1) Auditory activities: listening to oral presentations
2) Visual activities: reading assignments, watching videos, demonstrations, presentations
3) Tactile/Kinesthetic: solving problems, participating in in-class mini-projects

Materials – The course will be based on the textbook, "Introduction to Statistical Learning with Applications in R", by Gareth James, Danelia Witten, Trevor Hastie & Robert Tibshirani (Springer Texts in Statistics, 2013).

The link to the website for the proposed textbook can be found here: http://www-bcf.usc.edu/~gareth/ISL/.

It includes a link to download the book PDF.

Computer Access – Students are required to be able to access the class sessions on-line using Zoom.

Demonstrations – none.
ATTENDANCE

Attendance is mandatory. Students are expected to advise the instructor in advance if they will not be able to attend a class session. Missing quizzes and exams required prior approval and rescheduling.

TEXTBOOKS

Required: "Introduction to Statistical Learning with Applications in R, 2nd edition", by Gareth James, Danelia Witten, Trevor Hastie & Robert Tibshirani (Springer Texts in Statistics, 2021)

GRADING POLICIES AND EXAMINATION PROCEDURES

Describe in detail how grades for assignments/projects/tests will be weighted and factored into final grades, also include other information relevant to grading if applicable – for example information about extra credit, examination protocol, make-up exams, etc.

Grading System

The final grade will be based on the following weighted average: 80% for homework assignments, and 20% for Final project

A = 90-100%  B = 80-89%  C = 70-79%  F = < 70%

REQUESTS FOR ACCOMMODATIONS FOR DISABILITIES

In accordance with policy 4.2.3, Request for Accommodation Under the ADA and the ADA Amendments Act of 2008 (ADAAA), any student requesting accommodation must submit the appropriate request for accommodation under the American with Disabilities Act (ADA, form 100) to his/her appropriate Associate Dean of their School and a copy to the ADA Coordinator. Additional information may be obtained at http://uthscsa.edu/eeo/request.asp.

ACADEMIC INTEGRITY AND PROFESSIONALISM

Any student who commits an act of academic dishonesty is subject to discipline as prescribed by the UT System Rules and Regulations of the Board of Regents. Academic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an exam for another person, signing attendance sheets for another student, and any act designed to give unfair advantage to a student or the attempt to commit such an act. Additional information may be obtained at http://catalog.uthscsa.edu/generalinformation/generalacademicpolicies/academicdishonestypolicy/

TITLE IX AT UTHSCSA

Title IX Defined:
Title of the Education Amendments of 1972 is a federal law that prohibits sex discrimination in education. It reads “no person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance.”

University of Texas Health Science Center San Antonio’s Commitment:
University of Texas Health Science Center San Antonio (UTHSCSA) is committed to maintaining a learning environment that is free from discriminatory conduct based on gender. As required by Title IX, UTHSCSA does not discriminate on the basis of sex in its education programs and activities, and it encourages any student, faculty, or staff member who thinks that he or she has been subjected to sex discrimination, sexual harassment (including sexual violence) or sexual misconduct to immediately report the incident to the Title IX Director.

In an emergency, victims of sexual abuse should call 911. For non-emergencies, they may contact UPD at 210-567-2800. Additional information may be obtained at http://students.uthscsa.edu/titleix/
EMAIL POLICY  none

USE OF RECORDING DEVICES

Permitted for personal use only

ELECTRONIC DEVICES

Electronic devices are permitted if they do not become a distraction for the class.

Class Schedule is TENTATIVE and will depend upon the progress of the class.

NOTE: Each class session is 2 hours

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<th>Session</th>
<th>Subject</th>
<th>Reference</th>
<th>Note</th>
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<tr>
<td>Mo 8/23</td>
<td>Prediction, Inference &amp; Model Accuracy (Pt.1)</td>
<td>ISL Ch.1 &amp; 2</td>
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<tr>
<td>Mo 8/30</td>
<td>Model Accuracy (Pt.2) &amp; Linear regression</td>
<td>ISL Ch.2 &amp; 3.1</td>
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<td>Mo 9/06</td>
<td>LABOR DAY HOLIDAY</td>
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<td>Mo 9/13</td>
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<td>ISL, Ch.3.2</td>
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<td>Mo 9/20</td>
<td>Classification</td>
<td>ISL, Ch.4</td>
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<td>Mo 9/27</td>
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<td>ISL, Ch.5.1</td>
<td>HOMEWORK #1 DUE</td>
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<td>Mo 10/04</td>
<td>The Bootstrap</td>
<td>ISL, Ch.5.2</td>
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<td>Mo 10/11</td>
<td>Subset Selection</td>
<td>ISL, Ch.6.1</td>
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<td>Mo 10/18</td>
<td>Shrinkage &amp; Dimension Reduction Methods</td>
<td>ISL, Ch.6.2</td>
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<td>Mo 10/25</td>
<td>Polynomials, Splines &amp; Generalized Additive Models</td>
<td>ISL, Ch.7</td>
<td>HOMEWORK #2 DUE</td>
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<td>Mo 11/08</td>
<td>Support Vector Machines</td>
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<td>Mo 11/15</td>
<td>Deep Learning</td>
<td>ISL, Ch.10</td>
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<td>Mo 11/22</td>
<td>Survival Analysis &amp; Censored Data</td>
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<td>HOMEWORK #3 DUE</td>
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<td>Mo 12/06</td>
<td>Clustering Methods</td>
<td>ISL, Ch. 12.4</td>
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*ISL = Introduction to Statistical Learning with Applications in R, 2nd edition, by Gareth James, Daniela Witten, Trevor Hastie & Robert Tibshirani (Springer Texts in Statistics, 2021)