ST 555 Course Syllabus

ST 555 - Statistical Computing I

Section 001
SPRING 2014
3 Credit Hours

Course Description

Converting data from whatever form it may arrive and preparing it for processing by statistical software. The first goal of this course will be the mastery of Base SAS programming, especially the DATA step. The second goal of this course is an introduction to R programming. Student must have regular access to computer for homework and class exercises.

Learning Outcomes

1) Write SAS code to read simple data files and spreadsheets
2) Convert a single record to multiple SAS observations when needed
3) Merge and set SAS datasets together properly
4) Create a user-written format as appropriate
5) Do common vector statistical calculations in R
6) Write a function that creates a likelihood function which is then maximized in R

Course Structure

Most of the course material will be presented by demonstrations of computer code, with regular Class Exercises (in small groups) for practice.

Instructors

Dr. John F Monahan (monahan) - Instructor
Email: monahan@stat.ncsu.edu
Web Page: http://www.stat.ncsu.edu/people/monahan/
Phone: 919-515-1917
Fax: 919-515-1169
Office Location: SAS Hall 5224
Office Hours: To be announced

Course Meetings

None.

Course Materials

Textbooks
Expenses
None.

Materials
None.

Requisites and Restrictions

Prerequisites
graduate standing and ST312 or ST305 or ST511

Co-requisites
None.

Restrictions
Credit for both ST445 and ST555 is not allowed

General Education Program (GEP) Information

GEP Category
This course does not fulfill a General Education Program category.

GEP Co-requisites
This course does not fulfill a General Education Program co-requisite.

Transportation
This course will not require students to provide their own transportation. Non-scheduled class time for field trips or out-of-class activities is NOT required for this class.

Safety & Risk Assumptions
None.

Grading

Grade Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>quizzes</td>
<td>3 quizzes x15% = 45% for the course</td>
<td>Three proctored, pencil-and-paper quizzes, explaining outcome of code snippets; some writing of code.</td>
</tr>
<tr>
<td>class exercises, 8 to 12</td>
<td>15% for the course</td>
<td>Working in groups to write computer code that successfully completes the required task.</td>
</tr>
<tr>
<td>homeworks, 6 to 8</td>
<td>40% for the course</td>
<td>Individual work, writing computer code to complete a task and answering specific questions about the data involved.</td>
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</tbody>
</table>
Letter Grades

This Course uses Standard NCSU Letter Grading Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>97 ≤</td>
</tr>
<tr>
<td>A</td>
<td>93 ≤</td>
</tr>
<tr>
<td>A-</td>
<td>90 ≤</td>
</tr>
<tr>
<td>B+</td>
<td>87 ≤</td>
</tr>
<tr>
<td>B</td>
<td>83 ≤</td>
</tr>
<tr>
<td>B-</td>
<td>80 ≤</td>
</tr>
<tr>
<td>C+</td>
<td>77 ≤</td>
</tr>
<tr>
<td>C</td>
<td>73 ≤</td>
</tr>
<tr>
<td>C-</td>
<td>70 ≤</td>
</tr>
<tr>
<td>D+</td>
<td>67 ≤</td>
</tr>
<tr>
<td>D</td>
<td>63 ≤</td>
</tr>
<tr>
<td>D-</td>
<td>60 ≤</td>
</tr>
<tr>
<td>F</td>
<td>0 ≤</td>
</tr>
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</table>

Requirements for Credit-Only (S/U) Grading

Performance in research, seminar and independent study types of courses (6xx and 8xx) is evaluated as either "S" (Satisfactory) or "U" (Unsatisfactory), and these grades are not used in computing the grade point average. For credit only courses (S/U) the requirements necessary to obtain the grade of "S" must be clearly outlined.

Requirements for Auditors (AU)

Information about and requirements for auditing a course can be found at http://policies.ncsu.edu/regulation/reg-02-20-04.

Auditors must earn a respectable D.

Policies on Incomplete Grades

If an extended deadline is not authorized by the Graduate School, an unfinished incomplete grade will automatically change to an F after either (a) the end of the next regular semester in which the student is enrolled (not including summer sessions), or (b) by the end of 12 months if the student is not enrolled, whichever is shorter. Incompletes that change to F will count as an attempted course on transcripts. The burden of fulfilling an incomplete grade is the responsibility of the student. The university policy on incomplete grades is located at http://policies.ncsu.edu/regulation/reg-02-50-03. Additional information relative to incomplete grades for graduate students can be found in the Graduate Administrative Handbook in Section 3.18.F at http://www.fis.ncsu.edu/grad_publicns/handbook/

Late Assignments

Late homeworks and class exercises will be accepted, subject to discounting in proportion to the lateness. No credit will be given if solutions are posted.
Attendance Policy

For complete attendance and excused absence policies, please see http://policies.ncsu.edu/regulation/reg-02-20-03

Attendance Policy

None.

Absences Policy

None.

Makeup Work Policy

Homework and Class Exercise should be completed regardless of attendance; excused absences may permit makeup of work without time penalty.

Additional Excuses Policy

None.

Academic Integrity

Academic Integrity

Students are required to comply with the university policy on academic integrity found in the Code of Student Conduct found at http://policies.ncsu.edu/policy/pol-11-35-01

Academic Honesty

See http://policies.ncsu.edu/policy/pol-11-35-01 for a detailed explanation of academic honesty.

Honor Pledge

Your signature on any test or assignment indicates "I have neither given nor received unauthorized aid on this test or assignment."

Electronically-Hosted Course Components

Students may be required to disclose personally identifiable information to other students in the course, via electronic tools like email or web-postings, where relevant to the course. Examples include online discussions of class topics, and posting of student coursework. All students are expected to respect the privacy of each other by not sharing or using such information outside the course.

Electronically-hosted Components: course web page with syllabus, notes, demonstration files, homework and class exercise files; class discussion board

Accommodations for Disabilities

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, student must register with the Disability Services Office (http://www.ncsu.edu/dso), 919-515-7653. For more information on NC State's policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation.
Non-Discrimination Policy

NC State University provides equality of opportunity in education and employment for all students and employees. Accordingly, NC State affirms its commitment to maintain a work environment for all employees and an academic environment for all students that is free from all forms of discrimination. Discrimination based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation is a violation of state and federal law and/or NC State University policy and will not be tolerated. Harassment of any person (either in the form of quid pro quo or creation of a hostile environment) based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation also is a violation of state and federal law and/or NC State University policy and will not be tolerated. Retaliation against any person who complains about discrimination is also prohibited. NC State’s policies and regulations covering discrimination, harassment, and retaliation may be accessed at http://policies.ncsu.edu/policy/pol-04-25-05 or http://www.ncsu.edu/equal_op/. Any person who feels that he or she has been the subject of prohibited discrimination, harassment, or retaliation should contact the Office for Equal Opportunity (OEO) at 919-515-3148.

Course Schedule

NOTE: The course schedule is subject to change.

Week 1 — 01/06/2014 - 01/10/2014

Basics of SAS: data step and procs, SAS datasets

Week 2 — 01/13/2014 - 01/17/2014

Reading data: list, column, format; reading from files

Week 3 — 01/20/2014 - 01/24/2014

data step language elements & structure, PDV, basic procs

Week 4 — 01/27/2014 - 01/31/2014

loops, SAS functions, Quiz 1

Week 5 — 02/03/2014 - 02/07/2014

multiple records to one obs, one record to multiple obs, arrays

Week 6 — 02/10/2014 - 02/14/2014
<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>02/17/2014 - 02/21/2014</td>
<td>reading spreadsheet files, set, proc append, sorting, Quiz 2</td>
</tr>
<tr>
<td>8</td>
<td>02/24/2014 - 02/28/2014</td>
<td>formats, permanent SAS datasets</td>
</tr>
<tr>
<td>9</td>
<td>03/03/2014 - 03/07/2014</td>
<td>merging datasets</td>
</tr>
<tr>
<td>10</td>
<td>03/17/2014 - 03/21/2014</td>
<td>using datasets from proc's, Quiz 3</td>
</tr>
<tr>
<td>11</td>
<td>03/24/2014 - 03/28/2014</td>
<td>Basics of R, vectors, seq and rep functions</td>
</tr>
<tr>
<td>12</td>
<td>03/31/2014 - 04/04/2014</td>
<td>vector calculations, constructing matrices, recycling</td>
</tr>
<tr>
<td>13</td>
<td>04/07/2014 - 04/11/2014</td>
<td>creating R functions, loops, conditionals</td>
</tr>
<tr>
<td>14</td>
<td>04/14/2014 - 04/18/2014</td>
<td>lists, data frames, basic optimization</td>
</tr>
<tr>
<td>15</td>
<td>04/21/2014 - 04/25/2014</td>
<td>reading data from files, R functions and environments</td>
</tr>
</tbody>
</table>