# STT 3850 Syllabus - Fall 2017

*Fall 2017*

**Instructor:** Dr. Alan T. Arnholt
**Office:** Walker Hall 237
**Office Hours:** 10-11:30am M, W, and F

Make an appointment to see me by clicking https://arnholtat.youcanbook.me/.

Teaching Assistants:

- Patrick Daye: dayep@appstate.edu — Office Hours: R 5-6pm Math Lab; R 3-5pm 307A
- Kory Illenye: illenyekd@appstate.edu — Office Hours: MW 11-12pm; TR 12-1pm; M 6-7pm Math Lab

**Course Description:**

This course provides an overview of modern statistical data analysis. Programming with data, including simulations and bootstrapping, will be an integral part of the course. Techniques for parsing univariate and multivariate data sets will be examined. Coverage of probability, random variables, standard probability distributions and statistical sampling distributions will be sufficient to prepare the student for statistical inference. Inferential topics will include parameter estimation, hypothesis testing for proportions, means and medians, goodness of fit tests, and tests for independence. Standard and computationally intensive regression techniques ~~will~~ may also be covered. (NUMERICAL DATA; COMPUTER) — Prerequisite: MAT 1110

**Course Objectives:**

1. Students will learn how to use a reproducible research work flow.
2. Students will improve their technology expertise.
3. Students will learn to work with large data sets.
4. Students will learn to create and present graphs for both univariate and multivariate data.
5. Students will learn how to construct and test hypotheses using both classical and randomization approaches.
6. Students will learn how to construct confidence intervals using both classical and bootstrap approaches.
7. Students will learn how to generate random and simple random samples and their relationships to permutation and bootstrap distributions.
8. Students will learn how to work with named sampling distributions (t, F, binomial, chi-square, and normal).
9. Students will learn the scope of inferential conclusions for numerous scenarios (experiments, observational studies, etc.).

**Course Text:**

- Chihara, L. and Hesterberg, T. (2011). *Mathematical Statistics with Resampling and R.* Hoboken, NJ: John Wiley & Sons, Inc.
- Text book web site contains errata, solutions, datasets, and R scripts. Other materials are available from the course webpage and AsULearn.

**Course Grading & Assessment:**

The only way to learn statistics is to **DO** statistics, which includes statistical software. Reading the textbook, learning the language, and practicing exercises using real data are critical to your learning and success. Class activities and assessments have been structured with these principles in mind.

You should read assigned textbook content and read/watch supplemental materials prior to coming to class. It will be easier to participate if you acquire some familiarity with the vocabulary and methods before we start to discuss and use them. You must "speak the language" (both statistics and R) to effectively demonstrate your knowledge.

Appalachian students are expected to make intensive engagement with courses their first priority. Practically speaking, students should spend about 1-3 hours on coursework outside of class for every hour they spend in class. For this four-hour course, you you should anticipate 2-6 hours per meeting period of outside work.

- 40% of the course grade will come from the eleven DataCamp assignments
- 15% of the course grade will come from weekly quizzes
- 15% of the course grade will come from the midterm exam
- 10% of the course grade will come from five graded homework assignments
- 20% of the course grade will come from the comprehensive final exam

Grades will be kept on AsULearn. You should monitor your grades throughout the term to make sure they appear to be correct and complete. Feel free to inquire about your grades at any time.

**How To Get Unstuck**

Well constructed questions will elicit answers more rapidly than poorly constructed questions. This video provides some background on asking questions. This stackoverflow thread details how to create a minimal R reproducible example. Please read How To Ask Questions The Smart Way by Eric Raymond and Rick Moen and heed their advice.

Please ask your well worded questions on piazza. Piazza will allow your fellow students to follow and answer questions quite possibly before the instructor or a TA has the chance to provide an answer. Piazza also allows the user to format code and write mathematics with LaTeX.

**University Policies**

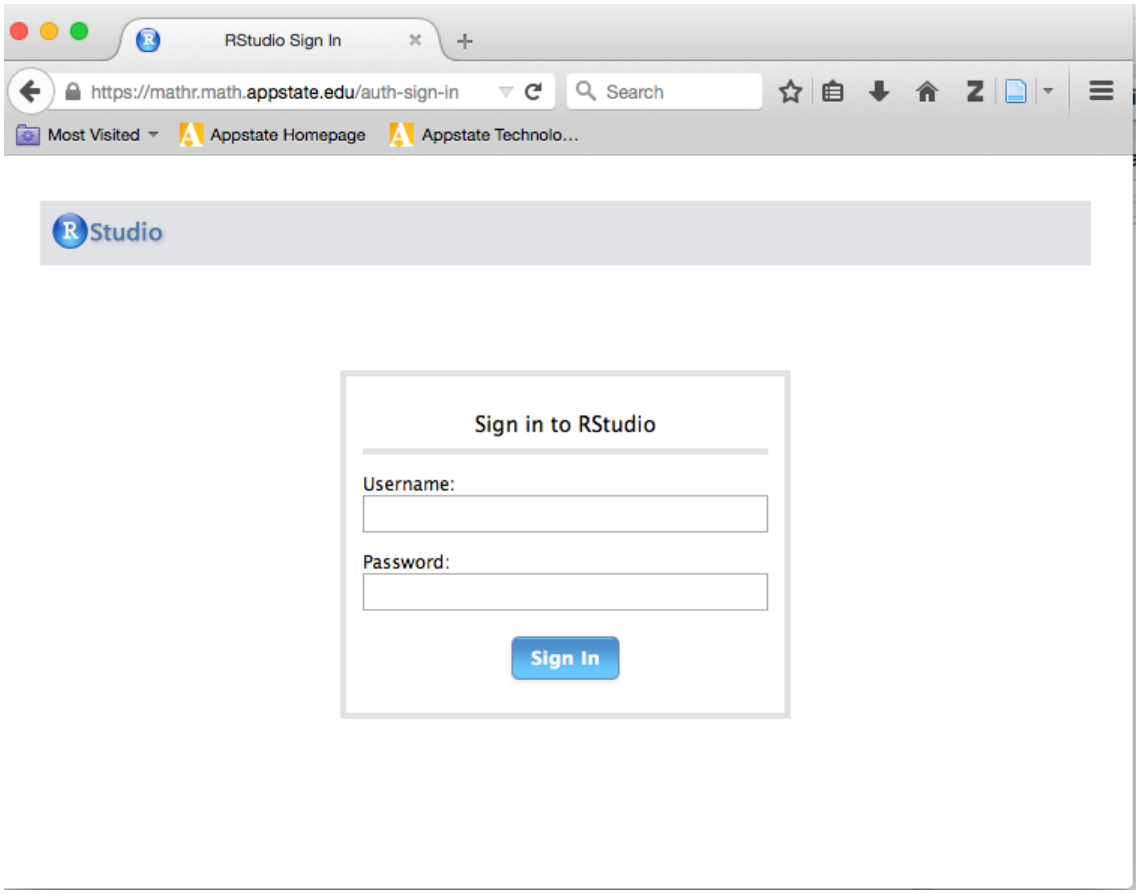
This course conforms with all Appalachian State University policies with respect to academic integrity, disability services, and class attendance. The details of the policies may be found at http://academicaffairs.appstate.edu/resources/syllabi.

**Computers and Software**

This course will use the RStudio server (https://mathr.math.appstate.edu/) that has the programs listed below and more installed.

- R
- Git
- RStudio
- LaTeX

You must have an active internet connection and be registered in the course to access the server. To access the server, point any web browser to https://mathr.math.appstate.edu/. You will need to acknowledge the connection is unsecure and possibly add a security exception to your web browser. Use your Appstate Username and Password to access the server. A screen shot of the RStudio server is shown below.




If you have problems with your Appstate Username or Password visit IT Support Services or call 262-6266.

**Required Technology**

- RStudio Server
- DataCamp
- GitHub
- AsULearn

Note: All technology used in the class is either open source (free) or will be accessible to students enrolled in the course for no cost.

**Assignments**

The CoursePacing guide has all course assignments and due dates.