

# Stat 21 Fall 2020 Syllabus

Professor Suzanne Thornton

**E-mail:** sthornt1@swarthmore.edu

**Office Hours:** W 3:00pm-4:00pm ET <https://swarthmore.zoom.us/j/98251441654>

F 11:00am-12:00pm ET <https://swarthmore.zoom.us/j/89462104560>

Please review this OH etiquette form:

<http://www.swarthmore.edu/NatSci/sthornt1/Stat021/OH-etiquette.pdf>

**Live Class Meeting Times:** Tu/Th 8:15–9:30am or 9:45–11:00am

(Note that I've pushed back section one by 15 minutes.)

## Course Description

Stat 21 is a second course in applied statistics that extends methods taught in Stat 11. Topics for this semester include chi-squared models and tests, analysis of variance, multiple linear regression, and model building. Both sections of this class are intended to be identical and will be graded together. Note that no prior programming experience is required for this class although we will be using RStudio (a widely used, open source, statistical analysis software interface) heavily.

## Prerequisites

AP Stat, Stat 11, Stat 61, Econ 31, or Stat 1 with permission of the instructor

## Links and resources

- Zoom

For live class meeting times:

Section 1 <https://swarthmore.zoom.us/j/95775829676>

Section 2 <https://swarthmore.zoom.us/j/92472713458>

For office hours: <https://swarthmore.zoom.us/j/98251441654> (W)

<https://swarthmore.zoom.us/j/89462104560> (F)

- Slack: [stat021f2020.slack.com](https://stat021f2020.slack.com)

- Slides: <http://www.swarthmore.edu/NatSci/sthornt1/Stat021/Stat21.html>

- Course material: <https://moodle.swarthmore.edu/>

- Homework/test submission: <https://www.gradescope.com/courses/159223>

Entry code: 94KJPP

- RStudio: <http://rstudio.swarthmore.edu/>

Shared folder location: [/shared/stat021f20](#)

How to access shared folder: <https://www.youtube.com/watch?v=ISOS1uzcmWI>

- Swat VPN: <https://kb.swarthmore.edu/display/PS/VPN+and+Off-Campus+Access>

### **Required Material**

- The textbook is meant to be a supplementary resource in addition to lecture videos, notes, and in-class discussions. It is freely available through Swarthmore's Tripod Library service. The book is *Introduction to Linear Regression Analysis, 5th Edition*. By Montgomery, Peck, and Vining.
- Writing pad and stylus to use to write on Zoom whiteboards during class. (These can be purchased through the [school's bookstore](#).)
- A laptop or computer with reliable internet access.
- A picture of your face only to share with the class in your Zoom and Slack profiles.
- Access to RStudio

### **Course Format**

The style of this class is similar to what is may be called a “flipped classroom”. For our purpose, this means that you are expected to do some preparatory work before class and during class you will be working with your classmates to solve problems and answer discussion questions presented by the instructor. You are still expected to complete weekly homework assignments outside of class.

**Before each class** you are responsible for completing the following tasks.

1. Watch each lecture video for the next class
2. Take the multiple choice comprehension quiz for that class until you get a perfect score

You will be in the same pre-assigned group of no more than six students for the entire semester. (If you encounter any trouble with your assigned group or have any concerns about who you are grouped with, please let me know before the first test.) The primary factor deciding groups is the time zone of the members. The only activities you are required to work with your group on are the in-class discussions and the final project. (However, I do encourage you to meet with your group at other times to discuss homework together and study together, etc.)

During the class meeting times (either 8:15–9:30am or 9:45–11:00am ET) you are responsible for attending our Zoom classroom where you will both meet with your pre-assigned group in breakout rooms and report back to present topics or questions to the entire class. During class time, each group must assign the following roles to different group members:

1. *Note-taker* - this is the person creating the presentation item on the Zoom whiteboard;

2. *Presenter* - this is the person who will report the presentation materials and general discussion;
3. *Recorder* - this is the person who takes notes on who is in attendance, who is participating, and keeps track of the time;
4. *Questioner* - this person will push back when the group comes to consensus too quickly, without considering a number of options or points of view.

Each group will determine a rotation order so that every member gets to try each position at least once throughout the entire semester. Every student must individually submit a group progress report on Fridays via Moodle so that I can help you make sure your group discussions are productive.

At the beginning of each class, your professor will provide you with an agenda and with questions and assignments to complete with your group. After a specified amount of time, the instructor will bring everyone back to the main Zoom meeting area and the pre-assigned group reporters will present their group's work. Every group member is required to present at least once during the semester. This process of large group questions, small group discussions, and large group presentations, may be repeated several times throughout a single class session. Video participation in Zoom is not required but audio participation is.

We will utilize all of the following online resources for this class.

- **Moodle** - for lecture videos, announcements, comprehension quizzes, and weekly group progress reports;
- **Gradescope** - to submit homework assignments and test solutions;
- **Swarthmore RStudio Server** - to access R Markdown homework templates and any data or R script files used in class;
- **Professor's personal webpage** - to access lecture slides used in the videos and the course syllabus;
- **Slack** - to communicate in real time with your group, the entire class, and/or the professor;
- **Zoom** - to attend live class meetings and office hours and to create presentation items on the whiteboard.

### **Grading Policy**

- 15% of your grade will be determined by class participation and attendance;
- 25% of your grade will be determined by a group final project;
- 30% of your grade will be determined by your highest 10 (out of 11) homework assignments;
- 30% of your grade will be determined by three open-book tests (worth 10% each).

It is *not possible* for you to get an A in this class if you are not actively **participating in and attending class**. In order to get a perfect grade for class participation and attendance you must: (1) attend at least 21 out of our 24 class meetings, (2) complete all of the pre-class comprehension quizzes with a grade of 100%, and (3) be an active participant in your group meetings.

The **comprehension quizzes** are all multiple choice and are due before each class session. They are complete only if you have a score of 100% but you can re-take these quizzes as many times as you need. Each new quiz is only available once you've reached a perfect score on the previous quiz so it's important to stay up-to-date with this!

You will be **assigned to a group** of no more than six people to work with throughout the entire semester. This is the group you will work with during our live class meetings and on your final project. Each Friday, you are expected to fill out a group work evaluation form on Moodle regarding the progress of your group's work that week. This will, in part, determine your participation and attendance grade. I will never share the contents of these evaluations with anyone else in the class.

**Homework** will be assigned every week. There will typically be 10 problems but only one (randomly chosen) problem will be graded for correctness. The remaining problems will be graded based on completion. The solutions for the homework problems will **not** be posted. If you have any questions on the homework you are expected to address them either with your group, in class, or during office hours. You are required to complete your homework assignments using R Markdown. R Markdown is a file format for making dynamic documents with R. An R Markdown document is written in markdown (an easy-to-write plain text format) and contains chunks of embedded R code. Once you have access to RStudio, it is easy to write and compile an R Markdown document since this is all built in to the interface. I will provide you with R markdown templates for your homework assignments.

The first and second **tests** will cover specific parts of the class material but the third test will be comprehensive. All tests will be open-book and open-"course material".

You can earn extra credit in this class by being the first person to notify me of typos in the class material. (I'll check time stamps in Slack and email!) You only get credit if you notify me within three days of the item release. You will get more extra credit points for more important typos (as opposed to a spelling mistake which will be worth less).

## **Academic Integrity and Responsibility**

By remaining enrolled in this class you are agreeing to the following pledge:

“I will not accept any input from other people (via internet or otherwise) on the quizzes or tests in this class. I will collaborate only with my group members and the instructor for the final project. I will cite any online resources I use but will not have a person outside of my group do any of the coding or writing for my project.

I understand that everyone in this class has a different background and life experiences making my learning environment richer. I will respect my classmates identities and contributions and to be a supportive peer in this learning environment.”

## **Additional Resources**

### **Accommodations for Accessibility**

In order to access the class material, pictures are a very important part of the course. If you are unable to see any of the images clearly or at all, please let me know ASAP so I can make arrangements for you.

Please take the time to fill out [this form](#) indicating your accessibility needs for this course. This information will help me make sure I keep the class accessible to everyone. Please note however that filling out this form is not a substitute for registering with the Student Disability Services.

If you need formal accommodations for a physical or mental disability or a chronic medical condition, please contact Student Disability Services via e-mail at [studentdisabilityservices@swarthmore.edu](mailto:studentdisabilityservices@swarthmore.edu). As appropriate, the office will issue students with documented disabilities or medical conditions a formal accommodations letter. Since accommodations require early planning and are not retroactive, please contact Student Disability Services as soon as possible. For details about the accommodations process, visit the website [here](#).

There are freely available [mental health resources](#) through Swarthmore that I encourage you to check out. *It's way easier to do math with a healthy brain than an anxious one and there is absolutely no shame in getting additional help with this!* School resources may still be available to you even if you are not currently residing on campus.

If you have comments or suggestions on how I can make the course better for you, please share them with me. I want you all to have a positive learning experience and welcome your feedback!

### **Getting Stats Help**

There are several resources available to you if you need assistance in this class. The first resource you have is your fellow classmates! You can learn a lot by asking and attempting to answer questions on Slack and/or in study sessions with your assigned group outside of class. The next resource available to you is, of course, my office hours (see above). These are times set aside specifically for you so that I can offer you more individualized feedback on any questions you may have.

The department also offers assistance in (virtual) Stat Clinics, drop-in study sessions run by friendly and knowledgeable upperclassmen. You can find a schedule for the Stat Clinics [here](#). Clinics are an opportunity for you to study, do homework, meet and work with classmates, and ask questions about statistics. Because clinics are drop-in, you are welcome to come and go as you please, but be sure to sign-in when you are there. To make the most of your time at the clinic, be sure to first try problems on your own, or bring questions you have from your text or lecture. Bringing your textbook and lecture notes is essential because these are helpful resources for both you and the Clinician working with you. There will likely be other students at Clinic with questions for the Clinician, so do not expect to get individual attention the entire time you are at the clinic. (That's what office hours are for!) Be open to working on other problems, thinking about and trying to work through the question you have for the Clinician, working with classmates, or doing other coursework while you wait to speak with the Clinician. For questions about Stat Clinics please visit their website [here](#) or contact Danielle Ledford, the Academic Support Coordinator for the Math/Stat Department. If you find that you are still needing statistics help after utilizing ALL of the above resources, you can request tutoring at no cost [here](#).

**Stat 21 Fall 2020 Calendar**  
**Statistical Methods II**

<b>Sept 8 and 10</b>	Review Normal RVs, CLT and sampling distributions; Introduce RStudio
<b>15 and 17</b>	Review inference for proportions and for means; Introduce conditional probability
<b>22 and 24</b>	Chi-square Procedures
<b>29 and 1</b>	ANOVA
<b>Oct 6 and 8</b>	ANOVA and SLR
<b>13 and 15</b>	Open-book Test 1
<b>20 and 22</b>	SLR and Inference
<b>27 and 29</b>	MLR only quantitative variables
<b>Nov 3 and 5</b>	MLR only categorical variables (ANOVA) and MLR Mixed
<b>10 and 12</b>	Inference and multiple comparisons or p-hacking
<b>17 and 19</b>	Model building and Open-book Test 2
<b>Dec 1 and 3</b>	Review

**Final Exams Dec 8-15**

Open-book Test 3

Final project - presenting a scientific paper