

# Econometrics

Dr. Ryan Safner

[metricsF19.classes.ryansafner.com](https://metricsF19.classes.ryansafner.com)

**Course:** ECON 480

**Room:** Rosenstock Trading Room

**Meets:** TuTh 2:00 P.M.–3:15 P.M.

**Email:** [safner@hood.edu](mailto:safner@hood.edu)

**Office:** Rosenstock Hall 118

**Hours:** TuTh 10:30–11:30 A.M.

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“There are three kinds of lies: lies, damned lies, and statistics.” – Benjamin Disraeli

**Econometrics** is the application of statistical tools to quantify and measure economic relationships in the real world. It uses real data to test economic hypotheses, quantitatively estimate causal relationships between economic variables, and to make forecasts of future events. The primary tool that economists use for empirical analysis is ordinary least squares (OLS) linear regression, so the majority of this course will focus on understanding, applying, and extending OLS regressions.

I assume you have *some* working knowledge of economics at the intermediate level and some basic statistical tools.<sup>1</sup> We will do some basic review of some necessary statistics and probability at the beginning until everyone is comfortable, before jumping right into regressions.

## 1 Course objectives

**By the end of this course, you will:**

1. apply the models of microeconomics (constrained optimization and equilibrium) towards explaining real world behavior of individuals, firms, and governments
2. explore the effects of economic and political processes on market performance (competition, market prices, profits and losses, property rights, entrepreneurship, market power, market failures, public policy, government failures)
3. apply the economic way of thinking to real world issues in writing
4. understand how to evaluate statistical and empirical claims;
5. use the fundamental models of causal inference and research design;
6. gather, analyze, and communicate with real data in R.

I am less concerned with forcing you to memorize and recite proofs of statistical estimator properties, and more concerned with the development of your intuitions and the ability to think critically as an empirical social scientist—although this will require you to demonstrate proficiency with some intermediate statistical and mathematical tools.

Given these objectives, this course fulfills all three of the learning outcomes for [the George B. De-laplane, Jr. School of Business](#) Economics B.A. program:

- Use quantitative tools and techniques in the preparation, interpretation, analysis and presentation of data and information for problem solving and decision making [...]
- Apply economic reasoning and models to understand and analyze problems of public policy [...]
- Demonstrate effective oral and written communications skills for personal and professional success[...]

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<sup>1</sup>The formal prerequisites for this course are **ECON 205** and **ECON 206**; **ECMG 212** or **MATH 112**; and **ECON 305** or **ECON 306**

Fair warning: **Econometrics is hard**. *It will be one of the hardest economics courses that you will take, primarily due to the mathematical content.* I will do my best to make this class intuitive and helpful, if not interesting. If at any point you find yourself struggling in this course for any reason, please come see me. Do not suffer in silence! Coming to see me for help does not diminish my view of you, in fact I will hold you in *higher* regard for understanding your own needs and taking charge of your own learning. There are also some fantastic resources on campus, such as the [Center for Academic Achievement and Retention \(CAAR\)](#) and the [Beneficial-Hodson Library](#).

See my [tips for success in this course](#).

## 2 Course materials

You can find all course materials at my academic website dedicated for (all sections of) this course [microf19.classes.ryansafner.com](https://microf19.classes.ryansafner.com).

My lecture slides will be shared with you, and serve as your primary resource, but our main “textbook” below is **recommended** as the next best resource and will be available from the campus bookstore.

### 2.1 Books

The following book is **required**<sup>2</sup> and will be available from the campus bookstore.

- Bailey, Michael A, 2019, *Real Econometrics*, New York: Oxford University Press, 2<sup>nd</sup> ed.

You are welcome to purchase the book by other means (e.g. Amazon, half.com, etc). I have no financial stake in requiring you to purchase this book. The (cheaper) 1st edition is sufficient, but makes significantly less use of R (in favor of STATA).

The following two books are **recommended**, and are free online<sup>3</sup>:

- Grolemund, Garrett and Hadley Wickham, [R For Data Science](#)
- Ismay, Chester and Albert Y Kim, [Modern Dive: Statistical Inference Via Data Science](#)

The first book is the number one resource for using R and `tidyverse`, and is written for beginners. I still look at it *frequently*. The second is another great reference for using `tidyverse` in the context of basic statistics.

### 2.2 Software

You are **strongly recommended** to download copies of R and R Studio on your own computers. These software packages are available on all computers in the trading room, and you will have access to them during the week to work on assignments.

We will also have a shared class workspace in [RStudio.cloud](#) that runs a full instance of R Studio in your web browser (so no need to install anything!) will let you access files and assignments.

### 2.3 Articles

Throughout the course, I will post both required and supplemental (non-required) readings that enrich your understanding for each topic. Check Blackboard *frequently* for announcements and updates to assignments, readings, and grades.

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<sup>2</sup>You are not *obligated* to buy it, I just **strongly recommend** it in the sense that you will still have access to all data and assignments without possessing the book. But this is a course where you really will want to understand the derivations or get additional context beyond just my slides...

<sup>3</sup>You can purchase a hard copy of the first one if you really want.

### 3 Assignments and grades

You can find descriptions for all the assignments on the [assignments page](#).

|   | Assignment             | Percent |
|---|------------------------|---------|
| 1 | Research Project       | 30%     |
| n | Problem sets (Average) | 25%     |
| 1 | Midterm                | 20%     |
| 1 | Final                  | 25%     |

All grades are based on the following traditional scale:

| Grade | Range   | Grade1 | Range1 |
|-------|---------|--------|--------|
| A     | 93–100% | C      | 73–76% |
| A–    | 90–92%  | C–     | 70–72% |
| B+    | 87–89%  | D+     | 67–69% |
| B     | 83–86%  | D      | 63–66% |
| B–    | 80–82%  | D–     | 60–62% |
| C+    | 77–79%  | F      | < 60%  |

These grades are firm cutoffs, but I do of course round upwards ( $\geq 0.5$ ) for final grades. A necessary reminder, as an academic, I am not in the business of *giving* out grades, I merely report the grade that you *earn*. I will not alter your grade unless you provide a reasonable argument that I am in error (which does happen from time to time).

### 4 Policies and Expectations

This syllabus is a contract between you, the student, and me, your instructor. It has been carefully and deliberately thought out<sup>4</sup>, and I will uphold my end of the agreement and expect you to uphold yours.

In the language of game theory, this syllabus is my commitment device. I am a very understanding person, and I know that exceptions to rules often need to be made for students. However, to be *fair* to *all* students the syllabus artificially constrains my ability to make exceptions at a whim for anyone. This prevents clever students from exploiting my congenial personality at everyone else's expense. Please read and familiarize yourself with the course policies and expectations of you. Chances are, if you have a question, it is answered herein.

#### 4.0.1 Attendance and Participation

I expect you to attend class and to come having already done the reading assigned for that day. I will remind you in class and possibly through Blackboard or email which readings I want you to read for the next class. You are all adults and I will treat you as such. I do not take attendance, nor do I grade formally for participation but I strongly recommended you attend class and participate for your sake and the sake of your classmates. If you are too distracted or are not prepared to learn, I suggest you stay home, where you can check Facebook more efficiently. I reserve the right to boost the final grades of students that I believe have made consistent, quality contributions above and beyond their peers in class conversations by up to 2.5 points.

<sup>4</sup>A syllabus can and will be used as a legal document for disputes tried at a court of law. Ask me how I know.

#### 4.0.2 Devices

You are allowed to have and use laptops and tablets in the classroom. I will not stop you, but I strongly discourage you from using these to take notes (see Tips for Success). As a courtesy to myself and to others, do not use your phone in class. I reserve the right to embarrass you in front of everyone if you do so.

#### 4.0.3 Absences and Make-Ups

You generally do *not* need to let me know if you are unable to make class, *unless* it is on the day of an exam. It will however, be your responsibility to acquire the notes from a classmate for any missed classes. If you are unable to attend an exam for a legitimate reason (e.g. sports/club events, traveling, illness, family issues), please notify me at least *one week* in advance, and we will schedule a make-up exam date. If you are ill or otherwise unable to attend on the day of the exam, contact me ASAP to make arrangements. Failure to do so, including desperate attempts to make arrangements only *after* the absence will result in a grade of 0 and little sympathy. I reserve the right to re-weight other assignments for students who I believe are legitimately unable to complete a particular assignment.

#### 4.0.4 Late Assignments

I will accept late assignments, but will subtract a specified amount of points as a penalty. See individual assignment descriptions for the amount of points taken off (as it varies by assignment). If an answer key is posted before you turn in your assignment, the maximum grade you can earn is an 80. Even if it is the last week of the semester, I encourage you to turn in late work: some points are better than no points!

#### 4.0.5 Grading

I will try my best to post grades on Blackboard's Grading Center and return graded assignments to you within about one week of you turning them in. There will be exceptions. Where applicable, I will post answer keys once I know most homeworks are turned in (see Late Assignments above for penalties). Blackboard's Grading Center is the place to look for your most up-to-date grades. You will also be given an Excel spreadsheet template where you can calculate your overall grade and forecast "what if" scenarios.

#### 4.0.6 Email Accounts

Students must regularly monitor their Hood email accounts to receive important college information, including messages related to this class. Email through the Blackboard system is my main method of communicating announcements and deadlines regarding your assignments. **Please do not reply to any automated Blackboard emails - I may not receive it!** My Hood email ([safner@hood.edu](mailto:safner@hood.edu)) is the best means of contacting me. I will do my best to respond within 24 hours. If I do not reply within 48 hours, do not take it personally, and *feel free to send a follow up email* in the very likely event that I genuinely did not see your original message.

#### 4.0.7 Office Hours

I am generally in my office Monday-Thursday during "normal business hours." You are always welcome to walk-in and chat about class, college, careers, or anything at all. Please do try to use the official office hours stated at the head of the syllabus if possible. If you need to meet at a different time, I request that you send me an email or let me know after class so I know when to expect you. If you want to go over material from class, please have *specific* questions you want help with. I am not in the business of giving private lectures (particularly if you missed class without a valid excuse).

Watch the excellent and accurate video explaining office hours (on website syllabus page):

#### 4.0.8 Enrollment

Students are responsible for verifying their enrollment in this class. The last day to add or drop this class with no penalty is **Tuesday, September 4**. Be aware of [important dates](#).

#### 4.0.9 Honor Code

Hood College has an Academic Honor Code which requires all members of this community to maintain the highest standards of academic honesty and integrity. Cheating, plagiarism, lying, and stealing are all prohibited. All violations of the Honor Code are taken seriously, will be reported to appropriate authority, and may result in severe penalties, including expulsion from the college. See [here](#) for more detailed information.

#### 4.0.10 Van Halen and M&Ms

When you have completed reading the syllabus, email me a picture of the band Van Halen and a picture of a bowl of M&Ms. If you do this *before* the date of the first exam, you will get 3 bonus points on the exam. Yes, this is real.

#### 4.0.11 Accessibility, Equity, and Accommodations

College courses can, and should, be challenging and bring you out of your comfort zone in a safe and equitable environment. If, however, you feel at any point in the semester that certain assignments or aspects of the course will be disproportionately uncomfortable or burdensome for you due to any factor beyond your control, please come see me or email me. I am a very understanding person and am happy to work out a solution together. I reserve the right to modify and reweight assignments at my sole discretion for students that I believe would legitimately be at a disadvantage, through no fault of their own, to complete them as described.

If you are unable to afford required textbooks or other resources for any reason, come see me and we can find a solution that works for you.

This course is intended to be accessible for all students, including those with mental, physical, or cognitive disabilities, illness, injuries, impairments, or any other condition that tends to negatively affect one's equal access to education. If at any point in the term, you find yourself not able to fully access the space, content, and experience of this course, you are welcome to contact me to discuss your specific needs. I also encourage you to contact the [Office of Accessibility Services](#) (301-696-3421). If you have a diagnosis or history of accommodations in high school or previous postsecondary institutions, Accessibility Services can help you document your needs and create an accommodation plan. By making a plan through Accessibility Services, you can ensure appropriate accommodations without disclosing your condition or diagnosis to course instructors.

## 5 Schedule

**You can find a full schedule** with resources for each class meeting on the [course website schedule page](#).