

Syllabus

Statistics for Business and Economics
BSAD 210 SPRING 2018

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| Instructor | David Youngberg, Ph.D. Department of Business and Economics Montgomery College—Rockville |
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| Office Number | 240.567.5144 |
| Office Location | HU 241 |
| Office Hours | M 12:30pm – 3:00pm R 12:45pm – 2:15pm F 12:00pm – 1:00pm And by appointment |
| Course Information | CRN #30564 TR 9:30am to 10:45am HU 311 CRN #30566 TR 11:00am to 12:15am HU 311 |
| Course Length | 01/23/2018 to 05/13/2018 |
| Course Materials | All course materials (lectures, practice exams, syllabus) will be available on my website and on Blackboard. |

I. Course Description

An introductory course in the business and economic application of descriptive and inferential statistics. The meaning and role of statistics in business and economics, frequency distributions, graphical presentations, measures of central tendency and dispersion, probability, discrete and continuous probability distributions, inferences pertaining to means and proportions, and regression and correlation, time series analysis, and decision theory will be discussed.

Prerequisites: High school algebra or its equivalent or consent of department.

Assessment levels: ENGL 101/101A; MATH 093/096; READ 120. Three hours each week.

II. Resources

- Sharpe, De Veaux, and Velleman. *Business Statistics: A First Course*. 3rd edition, Pearson, 2017. ISBN 13: 978-0-13-418244-5; ISBN 10: 0-13-418244-8
- You must sign up and use Blackboard; homework will be on Blackboard and papers will be submitted through Blackboard.

III. Student Learning Outcomes

Upon completion of this course, the student will be able to:

- 1) Organize and present data in a tabular as well as a graphical format.
- 2) Ascertain the appropriate use of and be able to calculate various measures of central tendency and dispersion.
- 3) Describe data using measures of central tendency and dispersion as well as coefficients of skewness and/or kurtosis.
- 4) Calculate and distinguish between various types of probability for one or more events
- 5) Evaluate probabilistic statements for discrete as well as continuous probability distributions.
- 6) Ascertain the appropriate use of various discrete as well as continuous probability distributions.
- 7) Make inferences based upon large as well as small samples through the development of one-tailed and two-tailed tests of hypotheses pertaining to population parameters.
- 8) Develop and apply regression and correlation models.
- 9) Develop and apply a time series model for the purpose of forecasting.
- 10) Evaluate the strength and causation of correlation and interpret the law of large numbers.
- 11) Employ probability to calculate payoffs under uncertain circumstances.
- 12) Interpret a test using Bayes' Theorem.
- 13) Understand the normal distribution and the Central Limit Theorem.
- 14) Understand how statisticians determine if a difference is random or truly unusual.
- 15) Succinctly communicate basic findings from a regression analysis.

IV. Format and Procedures

This course is made up mostly of lecture with class discussion and class activities to underline important concepts. Class discussion is paramount to the class, since I find interaction of this sort particularly valuable in understanding the economic ideas and how they fit into the world.

V. My Assumptions

I assume you have a basic curiosity about the world around you. I assume you are familiar with basic algebra and can correctly interpret diagrams and tables. I assume you will do the indicated readings.

VI. Your Responsibilities

You are responsible for all information in class even if you are late or absent. You are also responsible for checking your campus email daily. Course changes, suggestions for study, and other important messages will be posted by campus email. Bear in mind your Montgomery College email is the official means of communication.

You will turn off cell phones during exams and during class. Keep disruptions (e.g. side conversations) at a minimum (aka zero).

If you have a question, you are strongly encouraged to email me or visit my office hours. Your method of contact should be through my email address at Montgomery College. Do *not* email me through other methods, including Blackboard. I will not respond to such messages.

VII. Blackboard and My Website

My personal website contains all class materials including lecture notes, practice exams, syllabus, and readings. Please note that just because lecture notes are posted online does *not* mean class is optional. These notes are there to help you participate in class without having being distracted by writing down material.

You may also access course materials through Blackboard. All documents are named a particular way and you might want to familiarize yourself with my system. Each file always begins with what class the document is for, followed classes per week (if relevant), followed by the type of document, followed by the time of year (if relevant) and then the subsection of the type.

Here are three examples:

- pmacro2syllabusFh
 - “pmacro” means this pertains to ECON 201, principles of macroeconomics.
 - “2” means this document is for a class that meets twice a week.
 - “syllabus” means this is the syllabus.
 - “F” means this document pertains to the fall semester.
 - “h” means this document is for the honors section. If the document does not have an “h” after it, then that syllabus is for the non-honors section.
- pmicro3l06
 - “pmacro” means this pertains to ECON 202, principles of microeconomics.
 - “3” means this is for a class that meets three times a week.
 - “l” means this is a lecture (note is a lower-case “L” and not a one).
 - “06” means this is lecture number 6.
- statse02p01a
 - “stats” means this pertains to BSAD 210, business statistics.
 - “e02” means this is a practice exam for exam 2.
 - “p01” means this is the first practice exam available (there might be more than one for the same exam available in the future).
 - “a” means this is the answer key for that practice exam. If the document does not have an “a” after it, then that document is a blank exam without answers. I suggest you take that exam under simulated time pressure.

VIII. Standards of College Behavior

This section is quoted from the Student Code of Conduct. For more information, please visit [http://cms.montgomerycollege.edu/EDU/Verified - Policies and Procedures/PDF Versions/42001 Student Code of Conduct/](http://cms.montgomerycollege.edu/EDU/Verified_-_Policies_and_Procedures/PDF_Versions/42001_Student_Code_of_Conduct/).

The College seeks to provide an environment where discussion and expression of all views relevant to the subject matter of the educational forum are recognized as necessary to the educational process.

However, students do not have the right to interfere with the freedom of the faculty to teach or the rights of other students to learn, nor do they have the right to interfere with the ability of staff to provide services to any student.

Faculty and staff set the standards of behavior that are within the guidelines and spirit of the Student Code of Conduct or other College policies for classrooms, events, offices, and areas, by announcing or posting these standards early in the semester.

If a student behaves disruptively in the classroom, an event, an office, or an area after the instructor or staff member has explained the unacceptability of such conduct and the consequences that will result; the student may be asked to leave that classroom, event, office, or area for the remainder of the day. This does not restrict the student's right to attend other scheduled classes or appointments.

If the student does not leave, the faculty or staff member may request the assistance of Security.

The faculty or staff member must communicate with the student about the incident before the next class meeting to resolve the issue. If a second incident occurs that warrants removal from class, the faculty member again communicates with the student and must send a written report about the incident to the Dean of Student Development with a description of the incident and whether or not the incident is being referred to the formal disciplinary process.

The Dean of Student Development or designated instructional Dean of Workforce Development and Continuing Education should be informed in writing about any situation that should be addressed through the formal disciplinary process. The faculty or staff member will provide the Dean of Student Development with a written summary of the facts or conduct on which the referral is based within 48 hours of the incident for appropriate and effective disciplinary process, which must include the date, time, place, and a description of the incident.

IX. Academic Dishonesty

This section is quoted from the Student Code of Conduct. For more information, please visit http://cms.montgomerycollege.edu/EDU/Verified_-_Policies_and_Procedures/PDF_Versions/42001_Student_Code_of_Conduct/.

The maintenance of the highest standards of intellectual honesty is the concern of every student, faculty and staff member at Montgomery College. The College is committed to imposing appropriate sanctions for breaches of academic honesty.

See the above link for more information concerning what constitutes academic dishonesty and misconduct as well as possible sanctions imposed as punishment.

X. Disability Support Services

Any student who needs an accommodation due to a disability should make an appointment to see the course instructor during office hours. In order to receive accommodations, a letter from Disability Support Services will be needed. Furthermore, any student who may need assistance in the event of an emergency evacuation must identify the Disability Support Services Office.

XI. Veterans' Services

If you are a veteran or on active or reserve status and you are interested in information regarding opportunities, programs, and/or services, please visit the Combat2College website at <http://www.montgomerycollege.edu/combat2college/>.

XII. Attendance

Students are expected to attend all class sessions. In cases involving excessive absences from class, the instructor may drop the student from the class, but you are ultimately responsible for dropping yourself from the course. Auto-drop should not be assumed. Excessive absence is defined as one more absence than the number of classes per week during a fall or spring semester; the number of absences is pro-rated for accelerated sessions.

XIII. Withdrawal and Refund Policy

It is the student's responsibility to drop a course. Non-attendance of classes or failure to pay does not constitute official withdrawal. To view specific drop deadlines, log into your MyMC account, click on "My Class Schedule" under "Student Quick Links." Select the current term and click "View Drop Deadline Dates" at the bottom of the page.

XIV. Audit Policy

All students registered for audit are required to consult with the instructor before or during the first class session in which they are in audit status, and students are required to participate in all course activities unless otherwise agreed upon by the student and instructor at the time of consultation.

XV. Delayed Opening and Closing of College

On occasion, Montgomery College will announce a late opening or early closing of a specific campus or the entire college because of weather conditions or other emergencies.

- If a class can meet for 50% or more of its regularly scheduled meeting time *or* if the class can meet for 50 minutes or more, it will meet.
- Montgomery College will always operate on its regular schedule unless otherwise announced. Depending on the nature of the incident, notifications of emergencies and

changes to the College's operational status will be communicated through one or more communication methods include the College's web page.

XVI. Course Changes

The instructor reserves the right to alter the schedule of the course if necessary but will notify the students of any changes to the schedule before the changes are implemented.

XVII. Grading, Evaluation, and Assessment Procedures

Weight of Assignments

| <i>Assignment</i> | <i>Weight</i> |
|---------------------|---|
| Proposal | 4% |
| Tables | 4% |
| Memo | 16% |
| Blackboard Homework | 1% each; lowest two dropped (10% total) |
| Exams | 12% each (36% total) |
| Final | 20% |
| Participation | 10% |

Memo.

You will write a short memo at the end of this semester. I call it a "memo" rather than a "paper" to emphasize that this is supposed to be short. It shouldn't be more than three (3) pages long. If you think that short length means it's easy, think again! It is very difficult to convey all the relevant information in a small amount of space.

The memo will make an argument and use empirical data to support that argument. A regression analysis (to be explained in Unit 4) is required.

You will be provided a file with country-level (each observation is a country) and state-level (each observation is a U.S. state) data; the file is called Memo Datasets. You will use variables from either dataset to build your empirical argument. While there are plenty of variables to construct an interesting analysis, you should feel free to add your own variables. Please see me if you do this.

This assignment has three parts. Each part will be submitted through Blackboard. When submitting through Blackboard:

- Be sure you're submitting it as a Word document. To do this, attach the file through the submission section. Do not write the assignment in the comments section.
- Be sure you're submitting it through the correct assignment page.
- Be sure it was successfully submitted (you can check under your grades).
- Remember that your work will be submitted through SafeAssign. SafeAssign checks your work against work available on the Internet as well as a database of student papers. This

is plagiarism-detection tool and violations will result in a zero for the assignment or for the class.

- **Be aware:** if you're using the same original content in this paper and in a paper for another class, SafeAssign may read that as plagiarizing another student's paper (it doesn't say who wrote the paper you're allegedly copying). Make sure any "recycled" content is sufficiently rewritten or, better yet, write different papers for different classes.

The parts are:

- *Memo Proposal.*

This is a short summary of the question you wish to explore. It is sort of draft of your memo; use the panel data provided in the Memo Datasets file. Each observation should involve measurements taken at (more or less) the same time.

The proposal should establish one variable that's your dependent variable and three other independent variables that should cause that dependent variable. You must include a logical explanation for why each of the three independent variables should cause the dependent variable. This should be the bulk of the proposal.

The independent variables should be very different from one another. Don't use both murder rates and assault rates, for example. Be creative!

Avoid making a state's or country's population a variable. That variable is there so you can adjust other variables for population. While population *can* be an appropriate dependent or independent variable, it's tricky to do right and best be avoided for the purposes of this course.

Avoid obvious connections (e.g. the birth rate causing the death rate).

- *Tables.*

Using the different variables you will use for your analysis, provide three tables:

The descriptive statistics. Include the following information for each variable: number of observations, arithmetic mean, median, standard deviation, the minimum, and the maximum. Make sure to put the information into a table (label row 1 "Variable", row 2 "Observations," etc).

Regression analysis. Include the relevant parts of the regression: coefficients, p-values, R^2 , adjusted R^2 , significance F, and the number of observations.

Correlation table. Your paper will need a correlation table of your independent variables to show there's no multicollinearity. Include a correlation table in this and the final assignment.

The tables should be easy to read. Variable names should be brief (you'll explain them in sufficient detail in the prose of the memo), commas should be used for large numbers, use no more than three decimal places, the table should be single spaced, etc.

All of these tables will be incorporated into your memo; make them in Word and submit the Word file.

- *Memo.*

By now, your question should have turned into an argument. Instead of asking "What causes crime?" you should be arguing "X causes crime." This argument will be the basis of your memo.

Your memo will involve using panel data; it will not be a time series. That means that each observation will be a different state or country with measurements taken at (more or less) the same time.

Be sure to:

- Discuss why your argument is worth making
- Explain why you think this causation exists
- Include descriptive statistic, as above
- Support your argument with a regression including implications ("my regression suggests that for every additional year of school, criminal activity falls by X"). Also include a table of the critical information from your regression.
 - Remember to use logical rounding. For example, p values should be rounded to four decimal places.
- Discuss any weaknesses in your approach. For example, you might find that low levels of education lead to high crime rates. Does that mean if you educate criminals they'd go straight (because their earnings potential in legal areas of employment have gone up), or does that mean that certain personalities are drawn to the criminal world and such personalities would not handle school well, or does that mean that high crime rates create an environment which makes it difficult to get a good education? Solving such complications is beyond the scope of this course though it's important that you discuss them.
- Proofread!
- Remember, you are limited to three (3) pages. This includes any tables you use but does not include a works cited page.
- ***Submit your memo as a pdf.*** This is to avoid any formatting issues that might occur with your included tables.

Blackboard Homework.

There will be twelve homework assignments completed through Blackboard. The lowest two will be dropped.

You will have three (3) attempts to complete each homework. After each submission, you will be informed which questions were wrong. Your score for the homework will be your best score among all attempts.

Answers will be displayed after the due date has passed. Therefore, you *cannot* start the homework after the due date has passed and any homework submitted after the due date will *not* be accepted. Blackboard is very strict in this regard; even being one second late will mean you cannot start the homework.

Exams. The three exams will comprise of short answer, matching, and multiple choice. Since all exam dates are listed here, you will be expected to complete each one. Failure of completion results in a zero for the exam. Exceptions will only be made in extreme circumstances (such as a death in the family) and in those cases written proof (such as a death certificate) must be supplied.

Final.

The final is comprehensive. I suggest you review past exams to help prepare.

The final schedule for May is available now, on the college's website. You have signed up for these classes with this knowledge at hand. I will not let you take your final at a different time just because you don't like your schedule.

Participation.

I'm a strong believer that people learn best if they speak up. It's a good rule not just for learning but for life in general. However because there's a lot of material to cover, we cannot always have an in depth class discussion. Thus the expectations for participation reflect that—a substantive comment or question once a week will fulfill the requirement just fine.

XVIII. Late Policy

For *every* 24-hour period (rounded up) an assignment is late, there is a 10% penalty. Because all assignments are turned in through Blackboard, weekends do count towards this period (turning something in Monday when it was due Friday would count at a 30% penalty, not a 10% penalty).

If you miss an exam, you make appropriate arrangements with me and the Montgomery College Assessment Center. There is a form to fill out (the Faculty Test Request Form). I will not allow you to make up an exam after I've graded and passed it back.

Poor Internet or other technical problems is not a compelling reason to turn in an assignment late; this is a foreseeable problem—akin to traffic—and it's a possibility that should be accounted for.

XIX. Challenges

Students are encouraged to challenge how any assignment was graded. To challenge the score on a question, *type* a paragraph explaining why your answer is the correct one and are thus deserving of additional points. I am not, repeat *not*, interested in reading about any mistakes you made but why you believe you are more correct than I gave credit. These challenges are due one week after the graded assignment was passed back or posted on Blackboard.

XX. Reviewing Papers

I'm happy to look at your paper before you turn it in. However you *must* give it to me at least 72 hours before the assignment is due. I do not have time to review dozens of papers at the last minute and will refuse to look at any paper any closer to the deadline.

XIX. What's My Grade?

If you want to know your grade-to-date, multiply your score on each assignment by its weight (indicated in the previous section). Then divide by the total percent assigned so far. Compare the result with the grading scale (below) to determine your grade.

All assignments are out of 100 points. For participation, you'll want to adjust the weight of the participation for how far in the semester you are in. For example, if you want to know your grade about 20% into the semester, you'll want to give participation a 2% weight rather than a 10% weight.

Grading Scale (points needed for specific grades). Your grade, for both the midterm and the semester, will be determined by how many points you've accumulated throughout the class (by the table below).

A: 90+ | B: 80-89.99 | C: 70-79.99 | D: 60-69.99 | F: 0-59.99

Note that these are strict bounds: if you get 89.89 points for the semester, that's a "B," not an "A." I will only "round up" if I feel it's appropriate. This may mean you:

- Regularly went above and beyond what's required for full credit (such as discussion participation);
- Exhibited increasing mastery of the material as the semester moved forward (impressive, since the material gets harder as the semester moves forward); and/or
- Consistently demonstrated an understanding of particularly important question(s), especially if your fellow students had trouble with such question(s).

Example. Now that he's completed his first exam, Henry wants to know his grade-to-date. Here are his grades so far:

| <i>Item</i> | <i>Score</i> | <i>Weight</i> | <i>Item</i> | <i>Score</i> | <i>Weight</i> |
|-------------|--------------|---------------|---------------|--------------|---------------|
| Homework 1 | 100 | 1% | Participation | 100 | 2.5% |
| Homework 2 | 60 | 1% | Exam 1 | 76 | 15% |
| Homework 3 | 80 | 1% | | | |

Note that since it's so early on in the semester, we made Henry's discussion grade worth 2.5% (since we're one-fourth through the semester) rather than 10%.

Since all the homework is being adjusted by the same weight, we can add it all together first (240). And so:

$$240 \times 0.01 + 100 \times 0.025 + 86 \times 0.05 + 76 \times 0.15$$

$$2.4 + 2.5 + 4.3 + 11.25 = 20.45$$

The total percent so far is:

$$1\% + 1\% + 1\% + 2.5\% + 5\% + 15\% = 25.5\%$$

Now we divide:

$$20.45 / 0.255 = 80.2$$

Despite his Exam 1 grade, Henry's grade-to-date is a B (but just barely!).

XX. Tentative Schedule

The following table describes this course day-by-day. “#” indicates which numbered lecture is covered that day which will aid you finding the lecture notes on my website. “Text” indicates the chapter of the textbook we will be referencing that day.

Blackboard homework is always due the night before the exam at 11:59pm. The last three homework assignments are due the night *before* the review session at 11:59pm.

| UNIT | DATE | # | TOPIC | TEXT | |
|----------|--------------|------------------------------------|---|---------|--|
| I | 01/23 | 01 | Introduction | N/A | |
| | 01/25 | 02 | Understanding Excel | N/A | |
| | 01/30 | 03 | Sampling | 8 | |
| | 02/01 | 04 | Of Data and Displays | 1, 2, 3 | |
| | 02/06 | 05 | Law of Large Numbers and Central Tendency | 5 | |
| | 02/08 | 06 | More on Central Tendency | 2 | |
| | 02/13 | 07 | Dispersion | 3 | |
| | 02/14 | HOMEWORK 1-3 DUE AT 11:59PM | | | |
| | 02/15 | EXAM 1 | | | |

| | | | | | |
|--------------|---|------------------------------------|-------------------------------------|--------|--|
| II | 02/20 | 08 | The Normal Distribution and the CLT | 7, 11 | |
| | 02/22 | 09 | Confidence Intervals I | 9, 11 | |
| | 02/27 | 10 | Confidence Intervals II | 9, 11 | |
| | 03/01 | 11 | Hypotheses and Types of Error | 10, 11 | |
| | 03/06 | 12 | Hypothesis Testing I | 10, 11 | |
| | 03/08 | 13 | Hypothesis Testing II | 10, 11 | |
| | 03/13 | NO CLASSES—SPRING BREAK | | | |
| | 03/15 | | | | |
| | 03/19 | HOMEWORK 4-6 DUE AT 11:59PM | | | |
| 03/20 | EXAM 2 | | | | |
| III | 03/22 | 14 | Correlation & Causation | 4 | |
| | 03/26 | PROPOSAL DUE AT 11:59PM | | | |
| | 03/27 | 15 | Simple Linear Regression I | 4,14 | |
| | 03/29 | 16 | Simple Linear Regression II | 4,14 | |
| | 04/03 | 17 | Multivariable Regressions I | 15 | |
| | 04/05 | 18 | Multivariable Regressions II | 15 | |
| | 04/09 | TABLES DUE AT 11:59PM | | | |
| | 04/10 | 19 | Understanding Regressions | 14, 15 | |
| | 04/11 | HOMEWORK 7-9 DUE AT 11:59PM | | | |
| 04/12 | EXAM 3 | | | | |
| IV | 04/17 | 20 | Probability | 5 | |
| | 04/19 | 21 | Expected Value | 6 | |
| | 04/24 | 22 | Bayes' Theorem I | 5 | |
| | 04/25 | MEMO DUE AT 11:59PM | | | |
| | 04/26 | 23 | Bayes' Theorem II | 5 | |
| | 05/01 | 24 | Discrete Probability Models | 6 | |
| | 05/02 | HOMEWORK 10-12 AT 11:59PM | | | |
| | 05/03 | — | Review | N/A | |
| 05/10 | FINAL EXAM FOR THE 9:30AM CLASS: 8:00AM TO 10:00AM | | | | |
| 05/10 | FINAL EXAM FOR THE 11:00AM CLASS: 10:15AM TO 12:15PM | | | | |

Note: This syllabus is subject to change at the discretion of the Professor.