

DATA ANALYSIS

SPRING QUARTER, 2023

PAYAM POURASHRAF

SECTION 603

Location, Dates and Times:

- Tu and Th 11:50AM - 1:20PM, Room: LEWIS 01110 at Loop Campus

The D2L **Content** section will guide you through the course.

ABOUT THIS SYLLABUS

Please be sure that you read the syllabus in its entirety. In addition, several questions that come up regularly throughout the course can be answered by referring back to this document. *Please read and refer to this syllabus!*

CATALOG DESCRIPTION

Introduction to univariate data analysis methods. Descriptive statistics and data visualization methods. Overview of sampling techniques for data collection, and introduction to statistical inference methods for decision making including simple linear regression, estimation procedures using confidence intervals and hypothesis testing.

PREREQUISITE KNOWLEDGE

Only basic algebra is required.

COURSE INSTRUCTOR

Name: Payam Pourashraf
Email: ppourash@depaul.edu
Address: CDM Building Room M-107 (M = "Mezzanine Floor")

ABOUT YOUR INSTRUCTOR

My faculty bio can be found here:

<https://www.cdm.l.depaul.edu/Faculty-and-Staff/Pages/faculty-info.aspx?fid=1616>

HOW BEST TO REACH ME?

Email: I try to check emails regularly throughout the day. Sometimes I can reply to emails within an hour or two, sometimes it take several hours before I get to them. However, I do make every attempt to

answer all emails within 24 hours. In the event that this does not happen, please do feel free to resend the email. You don't have to "apologize for disturbing" me as the fault is mine!

I will never ignore an email from you. Therefore, if you do not receive a response from me, you may assume that the email got lost in the pile somewhere or ended up in my spam folder. In that case, please do resend it.

When e-mailing me, it is very important that you **include your name and course number in the subject**. I have various spam-filters on my e-mail, so if you don't do this, your e-mail may well end up in my spam folder. For example:

Subject: Guttierrez, IT-403: question about independence rule

Telephone: I am always willing to make phone appointments with students. However, please do NOT leave voicemail messages for me. The best way to reach me by far is via e-mail. If you wish to schedule a telephone appointment, e-mail me to do so.

Office Hours: I have regular office hours. You can find me here: **Will be announced soon**

I am happy to **arrange other mutually agreeable times to meet** apart from my formal office hours, which I recognize are not convenient for online students in particular. If you wish to schedule an appointment, please email me at least 2-3 times that are good for you, and I will email you back with an appointment. This saves a lot of back-and-forth as we try to come up with a mutually agreeable time. Also, please let me know if you prefer Zoom.

WAYS TO GET HELP IN THIS COURSE

CDM Tutors: Free tutoring is available for all students in this course. Please do make use of it! The tutoring center is located in the CDM building in downtown Chicago. Virtual tutoring for online students is also available. You can find out more information [here](#).

D2L Discussion Forum: Post course content questions to the D2L forum so I can answer you and share the answer with the class [posting to the Board is better than emailing me as *someone else in the class might answer you before I do* (plus any answer I give is available to everyone)].

It is possible to subscribe to this forum so that you receive a notification every time someone posts. *I would definitely recommend that you do so.*

Here are the steps:

1. Log into D2L and go to the web page for this course.
2. Click on the tab labeled 'Discussions' at the top
3. There will be a heading along the lines of "General Discussions". Click on the little downward arrow next to it.

4. Click on Subscribe.

Reach out to the Instructor: I am happy to hear from you if you have questions, if something sparks your interest, or if you are struggling with some aspect of the course. If you are struggling, I'd much rather hear from you sooner than later.

COURSE GRADING BREAKDOWN

Quizzes	20%
Assignments	45%
Midterm Exam	15%
Final Exam	20%

IMPORTANT GRADING NOTES

- Your lowest assignment score will be dropped.
- Your two lowest quiz results will be dropped.
- A score of below 50% on the final exam cannot result in a course letter grade above a C-.
- A score of below 40% on the final exam cannot result in a course letter grade above a D.
- Not taking the final exam will result in a failing grade for the course.

SUMMER QUARTER MODIFICATIONS

- Because there are only four assignments during summer quarter, and one less week's worth of material covered, there will not be a dropped assignment during summer quarters.

APPROXIMATE GRADING SCALE

>= 93	A	80 to < 83	B-	67 to < 70	D+
90 to < 93	A-	77 to < 80	C+	60 to < 67	D
87 to < 90	B+	73 to < 77	C	< 60	F
83 to < 87	B	70 to < 73	C-		

IMPORTANT DATES

- Last day to drop the course without loss of tuition: **April. 10**
- Last day to withdraw from the course: **May. 12**
- Midterm Exam:
 - In-Class Students: Date: May 2nd, 2023
 - Students registered for the in-class section MUST take the exam in the classroom. They can not take it via a proctoring service.
 - Detailed information about the exam will be communicated to you via News posting about 2 weeks before.
- Final Exam:
 - In-Class Students: June 8th, 2023
 - Students registered for the in-class section MUST take the exam in the classroom. They can not take it via a proctoring service.
 - The exam ABSOLUTELY MUST be taken by the end date specified above. If you have extenuating circumstances and need to take it *earlier*, you may

contact me. I cannot promise that I can accommodate you, but if it is possible, I will try my best to arrange it.

- **There are NO options for taking the exam online.** The exam must be taken in person using one of the two options specified in the section titled “*Exams for Online Students*” below.

TEXTBOOKS AND OTHER RESOURCES

- **OpenStax Statistics:** The IT program committee has moved to an online textbook that does not have a required payment. The publishers of the text do request a contribution, which I would encourage all of you to make, but it is not required. The textbook can be found at: <https://openstax.org/details/books/introductory-statistics>
- **OpenIntro Statistics:** An excellent book. Perhaps has better explanations than OpenStax. <https://www.openintro.org/book/os/>
- **Humongous Book of Statistics Problems:** You can find this book at Amazon.com. It is very inexpensive. While this cannot be used as the course textbook, it would be a very helpful tool for you in this course. In spite of its title, the book is not huge or daunting. It is a book of straight-forward exercises with explanations. Doing lots of problems is the key to getting through the course, so I would strongly encourage you to buy and use this book.

COURSE POLICIES

QUIZZES

Unlike assignments, **all quizzes MUST be completed on time**. If you miss the deadline a 0 will be recorded as the result for that quiz. (Remember that your *two* lowest quiz scores will be dropped).

While you may retake the quizzes as many times as you like for review, only your first submission will be recorded as your grade. The reason is that the answers are shown once you submit the quiz. The only exception is the syllabus quiz in which your highest score will be recorded and may be taken as many times as you like (until the deadline).

‘Feedback’: You will note that after you submit a quiz, there is a ‘Feedback’ link below certain questions. Please ALWAYS view these feedback comments. They frequently remind/reinforce certain important concepts.

ASSIGNMENTS

- Assignments may be turned in up to two days after the due date with a small penalty (typically 3 points out of 40) per day late. Late assignments (i.e. after the two-day grace period) will not be accepted, as it would be unfair to other students. However, things do happen, so for this reason, your lowest assignment score will be dropped in the calculation of your final grade.
- **Make sure that you submit the correct assignment!** It is up to the student to ensure that their attachment is not empty, and also that it contains the appropriate files. Accidentally submitting, say, the previous week’s assignment will not be considered a valid excuse.

- If you make modifications to an assignment that you have already submitted, you are welcome to upload the newer version to D2L provided, of course, that it is uploaded before the assignment deadline. I will always grade your most recent submission.
- Assignments may not be submitted as PDF! If you do, the grader will assign you a 0 for the assignment.
- Please note that all assignments will be run through **Turnitin** which is plagiarism detection software. This software compares your assignment with all other submissions ever submitted for this course. This database also includes the online "tutoring" services that sell other students' work.

EXAMS FOR ONLINE STUDENTS

As online students, exams will be proctored at DePaul University and at other remote locations.

Please note the following:

- Exams MUST be taken either
 - Through DePaul's online learning proctoring service, or
 - If you live more than 30 miles away from DePaul University, at a certified proctoring center.
 - Unfortunately, there are NO options for taking the exam online.
- If you are unable or unwilling to take the exam in person using one of the two options above (proctored at DePaul, proctored at a certified testing center), *you should not register for this course.*
- Students must have vaccination documentation or an exemption on file if they are coming to campus.
- You register for exams through D2L. About 2-3 weeks before the exam, you will see a widget at the top of your D2L course page allowing you to register. I will send out an email reminder asking you to register as the exam time approaches.
- Exams must be completed within the specified time window (see "Important Dates" above).
- A score of 0 will be recorded for the exam if it is not taken within the timeframe. Makeups will not be offered without very extenuating circumstances, and documentation will always be required. It is not possible to pass the course without taking the exam.
- The exam scheduling window will be opened about 2 weeks before the exam week. I will email the class when scheduling is available. It is always a good idea to register right away for proctored exams since preferred times and locations do fill up.

- **Important:** There are several things to know about taking exams for online students. Please be sure to read the [online student policies document](#) for detailed information.
- **Also Important:** All questions relating to online exams should be directed to the online learning staff. That is, please do not contact me with questions about online exams. The online learning staff can be reached at olstaff@cdm.depaul.edu. The reason you should contact the OL staff instead of me is that I do not have anything to do with the organization or scheduling of online exams. All of this is handled by CDM's online learning staff.
 - For example, if you need to modify an existing exam reservation (i.e. change day or time), please email olstaff@cdm.depaul.edu if the Exam App prevents you from making changes

YOUR NAME PREFERENCE AND PRONOUNS

Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the quarter so that I may make appropriate changes to my records. Please also note that students may choose to identify within the University community with a preferred first name that differs from their legal name and may also update their gender. The preferred first name will appear in University related systems and documents except where the use of the legal name is necessitated or required by University business or legal need. For more information and instructions on how to do so, please see the Student Preferred Name and Gender Policy at <http://policies.depaul.edu/policy/policy.aspx?pid=332>

GETTING STARTED

DePaul University uses Desire 2 Learn (D2L) as our course management system: <https://d2l.depaul.edu>

All course content, assignments and grades will be posted here. It is your responsibility to keep up with all class materials through this website. You will also be required to submit your work through D2L.

While there may be a slight learning curve the first few times you navigate the site, it should not take long before you develop some comfort with it. D2L is not very difficult to use, there is a slight learning curve. Once you have finished reading this syllabus, you can look at a series of explanations and tutorials [can be found here](#).

REQUIRED RESOURCES

You will need to make use of several of the resources listed under General Course Resources on the 'Content' tab of D2L). We will discuss specifics such as the statistical software R as we progress through the course.

NEWS POSTINGS

After the first few days of the quarter, all communications will occur through D2L 'News' postings. So make absolutely certain that you have "subscribed" to News postings. By subscribing, all News postings will automatically be sent to your email or whichever preferred notification method you choose.

Doing so is quite easy. Here are the steps:

1. Log into D2L and go to the web page for this course.
2. Click on 'Course Home'
3. Click on the little down arrow next to the word 'News' and choose 'Notifications'
4. Under 'Contact Methods' enter your email address
5. Under 'Instant Notifications' check 'News - New Item Available'

EXTRA CREDIT

Please note that there will not be any extra credit opportunities. It's not that I do not want to, but rather that I cannot give "extra" opportunities, as this would be tremendously unfair to all of the other students in the class. However, I do give options for things that may go wrong by dropping your lowest assignment, and dropping your two lowest quizzes.

CHANGES TO SYLLABUS

This syllabus is subject to change as necessary during the quarter. If a change occurs, it will be communicated to you via News postings and/or email.

COLLEGE POLICIES

ONLINE COURSE EVALUATIONS

Evaluations are a way for students to provide valuable feedback regarding their instructor and the course. Detailed feedback will enable the instructor to continuously tailor teaching methods and course content to meet the learning goals of the course and the academic needs of the students. They are a requirement of the course and are key to continue to provide you with the highest quality of teaching. The evaluations are anonymous; the instructor and administration do not track who entered what responses. A program is used to check if the student completed the evaluations, but the evaluation is completely separate from the student's identity. Since 100% participation is our goal, students are sent periodic reminders over three weeks. Students do not receive reminders once they complete the evaluation. Students complete the evaluation online in Campus Connect.

ACADEMIC INTEGRITY AND PLAGIARISM

This course will be subject to the university's academic integrity policy.

The DePaul Student Handbook defines plagiarism as follows: "Plagiarism includes but is not limited to the following: (a) The direct copying of any source, such as written and verbal material, computer files, audio

disks, video programs or musical scores, whether published or unpublished, in whole or in part, without proper acknowledgement that it is someone else's. (b) Copying of any source in whole or in part with only minor changes in wording or syntax even with acknowledgement. (c) Submitting as one's own work a report, examination paper, computer file, lab report or other assignment which has been prepared by someone else. This includes research papers purchased from any other person or agency. (d) The paraphrasing of another's work or ideas without proper acknowledgement." Plagiarism will result in a failure of the assignment or possibly of the course. If you are unsure of how to cite a source, ask!

- More information can be found at <http://academicintegrity.depaul.edu/>. If you have any questions, consult with instructor.
- **NOTE:** Please note that you may be contacted at any time throughout the course and asked to explain work that you have submitted on your assignments.
- **Penalties:** Can include but are not limited to: 0 on the assignment or exam. Dropping of a full letter grade in the course. Assignment of an F grade for the course.
- **ALL academic integrity violations will be reported to the academic integrity committee.** A finding of violation of academic integrity will result in a record of this event being placed in the student's academic record.

PUBLIC POSTING OR SHARING OF COURSE MATERIALS

ALL STUDENTS ARE EXPECTED TO ABIDE BY THE UNIVERSITY'S ACADEMIC INTEGRITY POLICY WHICH PROHIBITS CHEATING AND OTHER MISCONDUCT IN STUDENT COURSEWORK. PUBLICLY SHARING OR POSTING ONLINE ANY PRIOR OR CURRENT MATERIALS FROM THIS COURSE (INCLUDING EXAM QUESTIONS OR ANSWERS), IS CONSIDERED TO BE PROVIDING UNAUTHORIZED ASSISTANCE PROHIBITED BY THE POLICY. BOTH STUDENTS WHO SHARE/POST AND STUDENTS WHO ACCESS OR USE SUCH MATERIALS ARE CONSIDERED TO BE CHEATING UNDER THE POLICY AND WILL BE SUBJECT TO SANCTIONS FOR VIOLATIONS OF ACADEMIC INTEGRITY.

INCOMPLETE

An incomplete grade is given only for an exceptional reason such as a death in the family, a serious illness, etc. Any such reason must be documented. Any incomplete request must be made at least two weeks before the final, and approved by the Dean of the College of Computing and Digital Media. Any consequences resulting from a poor grade for the course will not be considered as valid reasons for such a request. Incompletes are only granted when the large majority of the course work has already been completed.

ACADEMIC POLICIES

All students are required to manage their class schedules each term in accordance with the deadlines for enrolling and withdrawing as indicated in the [University Academic Calendar](#). Information on enrollment, withdrawal, grading and incompletes can be found at: cdm.depaul.edu/enrollment.

STUDENTS WITH DISABILITIES

Students who feel they may need an accommodation based on the impact of a disability should contact the instructor privately to discuss their specific needs. All discussions will remain confidential.

To ensure that you receive the most appropriate accommodation based on your needs, contact the instructor as early as possible in the quarter (preferably within the first week of class), and make sure that you have contacted the Center for Students with Disabilities (CSD) at: csd@depaul.edu.

Lewis Center 1420, 25 East Jackson Blvd.

Phone number: (312)362-8002

Fax: (312)362-6544

TTY: (773)325.7296

DECORUM / DEPARTMENT

Most of the following will apply primarily to in-class sections.

- **Attendance:** For in-class sections, students are expected to attend each class and to remain for the duration. However, attendance will not be factored into your final grade.
- **Class Discussion:** Whether in-class or online, student participation in class discussions will be measured in two ways. First, students are highly encouraged to ask questions and offer comments relevant to the day's topic. Participation allows the instructor to "hear" the student's voice when grading papers. Secondly, students will be called upon by the instructor to offer comments related to the reading assignments. Students must keep up with any assigned readings to participate in class discussion.
- **Attitude:** A professional and academic attitude is expected throughout this course. Measurable examples of non-academic or unprofessional attitude include but are not limited to: talking to others when the instructor is speaking, mocking another's opinion, cell phones ringing, emailing, texting or using the internet whether on a phone or computer. If any issues arise a student may be asked to leave the classroom. The professor will work with the Dean of Students Office to navigate such student issues.
- **Civil Discourse:** DePaul University is a community that thrives on open discourse that challenges students, both intellectually and personally, to be Socially Responsible Leaders. It is the expectation that all dialogue in this course is civil and respectful of the dignity of each student. Any instances of disrespect or hostility can jeopardize a student's ability to be successful in the course. The professor will partner with the Dean of Students Office to assist in managing such issues.
- **Cell Phones/On Call:** If you bring a cell phone to class, it must be off or set to a silent mode. Should you need to answer a call during class, students must leave the room in an undistruptive manner. Out of respect to fellow students and the professor, texting is never allowable in class. If you are required to be on call as part of your job, please advise me at the start of the course.

- **Student Responsibilities:** Each student is responsible for their time management and for meeting the expectations in the syllabus. The instructor is not responsible for reminding students of assignment deadlines in class. In the event of an absence, it is the student's responsibility to contact the instructor regarding the absence and the topics covered in class. If an assignment is listed on the syllabus, you are still responsible for completing the assignment on time.

APPENDIX 1: LEARNING OUTCOMES

LIST OF LEARNING OUTCOMES

To adequately prepare students in statistical and computational reasoning skills, objectives for this course include following learning outcomes:

1. Recognize and explain statistically based results from real data (either primary or secondary) and evaluate whether reported conclusions reasonably follow from the study and analysis conducted.
2. Use statistical software to produce and interpret graphical displays and statistical summaries.
3. Recognize and explain the roles of variability and randomness in interpreting data and drawing conclusions.
4. Explain common ethical issues associated with sound statistical practice, including those associated with research design, and their impact on statistical decision-making.
5. Measure the strength of association between variables and identify possible effects of confounding or interacting variables on the interpretation of the association.
6. Apply basic ideas of statistical inference, including confidence intervals or hypothesis testing, in a variety of settings.

HOW LEARNING OUTCOMES WILL BE MET

Statistics is a rigorous intellectual challenge that must be approached systematically with extreme attention to detail. The assumptions, and mathematical rigor used to make decisions regarding which formulas to apply, as well as to build and evaluate models, require a solid understanding of the underlying theory. To that end, students will be asked not merely to “get the answer”, but to always justify their answer(s). Students will be confronted with scenarios in which the “expected” formula or model turns out to be the “wrong tool for the job”, and it is expected that they will be able to

recognize such situations when they occur. In other words, the student will, at all times, be expected to understand the underlying theory and assumptions that underlie a given approach.

WRITING EXPECTATIONS

Writing is integral for communicating ideas and progress in science, mathematics, and technology. The form of writing in these disciplines is different from most other fields and includes, for example, mathematical equations, computer code, figures and graphs, lab reports and journals.

HOW WRITING EXPECTATIONS WILL BE MET

Throughout the course, students will be required to provide clearly written analyses of their interpretations of the results of their statistical calculations. The student will be required to explain their reasoning accompanied by specific examples from their own solutions to problems, and from their interpretation of concepts and examples discussed during the course.

APPENDIX 2: TENTATIVE SCHEDULE (SUBJECT TO CHANGE) TOPICS, LEARNING OBJECTIVES,

Week 1

Topics: Syllabus and overview of the course, Data Sources, Graphing, Descriptive Statistics, Introduction to R

Readings: OpenIntro Statistics, 2.1, 2.2; R Tutorial

Learning Outcomes: Students will understand where and how data is obtained. They will learn basic graphing techniques in terms of underlying techniques (i.e. some graphs will be drawn by hand), as well

as how to graph using statistical software. They will learn essential descriptive statistics including summary statistics, measures of center, measures of spread. They will learn how to do basic calculations, graphing, and descriptive statistics using R.

Week 2

Topics: Histograms, Outliers, Density Curves, Variation, R continued

Readings: OpenIntro Statistics, Chapter 2, 2.1-2.2, 2.3 (optional); R Tutorial

Learning Outcomes: Students will have a clear understanding of how to create and interpret histograms. They will understand what an outlier is, and techniques for identifying outliers. They will be able to identify different types of density curves and be particularly familiar with the normal density curve. They will be able to identify at least 2 different techniques for describing the variation in a data set, with emphasis on the standard deviation.

Week 3

Topics: Accurately calculating (i.e. not estimating) areas under the normal density curve, Applying variation calculations to different contexts, Empirical rule and Chebyshev theorem, Scatterplots, More R.

Readings: OpenIntro Statistics, 4.1, 4.2; R Tutorial

Learning Outcomes: Students will advance from their prior estimations of areas under the normal density curve to accurate calculations using R. They will demonstrate the ability to “compare apples and oranges” through the use of z-scores. They will be required to demonstrate the theoretical underpinnings of

normal and non-normal distributions through an understanding of the empirical rule and Chebyshev's theorem. They will be required to create and interpret scatterplots.

Week 4

Topics: Correlation, Linear Regression, Transformations, Outliers and Influential Points in Scatterplots, R contd.

Readings: OpenIntro Statistics, 8.1, 8.2, 8.3; R Tutorial

Learning Outcomes: Students will demonstrate an understanding of correlation between two variables, and the process of generating a linear regression model between two variables using R. They will be understand that generating a linear regression model is pointless and misleading if the correlation is not at least moderately strong. They will demonstrate how outliers and influential points can have an outsized effect on a regression model. They will know how to remove outliers and influential points from a regression model – but be able to justify their rationale for doing so in their written analysis.

Week 5

Topics: Correlation vs. Causation, Confounding/Lurking Variables, Biases in Sampling, Principles in Study Design

Readings: OpenIntro Statistics, 1.1-1.4; Outside readings/articles

Learning Outcomes: Students will demonstrate a clear understanding of the “correlation does not equal causation” principle. They will learn to always be looking out for potential confounders / lurkers among variables and demonstrate ways in which this can muddle subsequent inferences. They will learn about different types of bias in study and sampling design. They will learn about principles in study design including sampling techniques, stratification techniques, experimental methods, control groups, ethical considerations, etc. They will be guided through at least one well-designed high-level study from a respected publication.

MIDTERM WEEK (Week #6)

Topics: Midterm Exam

Learning Outcomes: In addition to assessment, the midterm week and exam is intended as an opportunity for students to review, regroup, and in some cases, simply to catch up.

Week 7

Topics: Probability: Introduction, Disjoint vs. Non-Disjoint Events, Independent vs. Non-Independent Events, General Addition and Multiplication Rules, Conditional Probabilities

Readings: OpenIntro Statistics, 3.1-3.5

Learning Outcomes: Students will demonstrate the ability to identify and distinguish disjoint vs. non-disjoint, independent vs. non-independent events, and to use that understanding to apply the addition and multiplication rules of probability. They will demonstrate the ability to recognize situations that require conditional (Bayesian) probability calculations and to do basic calculations involving them.

Week 8

Topics: Discrete vs. Continuous Probabilities, Expected Value, Introduction to Inference, Confidence Intervals

Readings: OpenIntro Statistics, 5.1; R Tutorial

Learning Outcomes: Students will recognize the difference between probability situations involving data that is of the discrete as opposed to continuous variety and know which formulas to apply as appropriate. They will demonstrate an understanding of the concept of “expected value” and know how to do expected value calculations using R. They will be able to define the term “inference” and describe at least two common types of inference in widespread use. They will be able to explain what is meant by a confidence interval, and to do confidence interval calculations at any specified confidence level.

Week 9

Topics: Hypothesis Testing, Complex / Unusual Data Sets

Readings: OpenIntro Statistics, 5.3-5.4; R Tutorial; Outside Readings/Articles

Learning Outcomes: Students will be required to articulate a null and alternative hypothesis in response to a research question. They will be required to demonstrate limitations and potential flaws in the use of p-values in inference calculations. Students will be exposed to large and more complex data sets including those of thousands of observations and larger, as well as data sets including relatively large numbers of

variables and to demonstrate an understanding of how to import these data sets into R for subsequent analysis.

Week 10

Topics: Multiple Regression, Feature Selection

Readings: OpenIntro Statistics, 9.1; R Tutorial

Learning Outcomes: Because many students may never proceed to a course in multiple regression, the

emphasis for this lecture will be on understanding the underlying principles as so much real-world modeling is, of course, based on multivariate analysis. Students will understand how multiple variables can and should be applied when generating more complex models, as well as the potential for generating flawed models without careful attention to possible confounders/lurkers. Students will learn how software such as R can be used to attempt to generate an optimal selection of variables for use in a multiple regression model.