# Department of Decision and Information Sciences

# BZAN6351: Basic Programming for Business Analytics

# Fall 2021

**Instructor:** Dr. Jinghui (Jove) Hou ("Hou" is pronounced as / hōl/)
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**Class TA:** Michael Lewis
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**Course format:** Hybrid
**Class meetings:** Online (asynchronous), or Thursdays 4:00 – 5:30 PM (Melcher Hall 110)
**Course website:** see Blackboard

## COURSE DESCRIPTION:

This course is designed to introduce the fundamental of programming for business analytics using R. R is a powerful language for data management, visualization, and predictive modeling; it is now one of the most popular languages in business analytics. In this course, you'll be learning about the basics of R, and you'll end with the confidence to write your own R scripts.

## LEARNING OBJECTIVES:

This course takes you from having no previous experience in programming to an intermediate level in R. Upon completion of this course, students should be able to:

- Use RStudio, read R documentation, and write R scripts.
- Use R programs to perform data manipulation/management and analysis tasks.
- Produce basic graphics and more advanced graphics using ggplot2 library.
- Report results of statistical analyses with R Markdown.
- Learn further R on your own, or other programming languages.
- Develop professional skills: creative thinking, critical thinking, and self-directed learning.

## PREREQUISITE:

1. **STAT 3331 or BZAN6310/6352. Basic knowledge of statistics is <u>presumed</u>!**
2. Prior programming experience is useful, but neither required nor presumed.
3. Basic computer skills are expected, including accessing Blackboard and your email, downloading and uploading files, connecting to the internet and using a search engine.

If you experience technical difficulties, please contact UH Blackboard Support or University Information Technology services.

## TEXTBOOKS:

Required materials:
- The following texts are available for free online. Students may find it useful to own a personal copy of one or two of the texts.
  *R for Data Science*, by Garrett Grolemund and Hadley Wickham
  *R Programming for Data Science*, by Roger Peng

- I will provide other required materials and resources on the course site.

Reference textbook:
- The following texts are recommended for students who want to know more about statistics. Both are available on Blackboard.
    *Statistics with R*
    *Using R for Introductory Statistics*, by John Verzani

**COURSE METHODS:**

**1. Hybrid format[1].** This class uses a hybrid format. Course contents will be delivered online through the Blackboard course system. On the course site, you will access online lessons, course materials, and additional resources. We will also hold some sections in the classroom. These face-to-face sections are scheduled for exams and reviews. The schedule for these sections is in the Course Schedule on the last pages of this syllabus. A detailed schedule is provided in the Course Calendar.

*Please note*: It is your responsibility to keep track of course materials available dates, homework dates, exam and review section dates, and project due dates (see the Course Calendar for details, which is available on Blackboard).

**2. Homework.** Homework is to be submitted **by 4pm on Fridays** on the due date indicated in the Course Schedule. Please be sure to keep a copy of the assignment by yourself in case that there is any problem with your submission. **No late submissions will be accepted**.

You may have discussions with your class members, but you must submit your own work. Every line of text and line of code that you submit must be written by you personally. You may not refer to another student's code. **Copied work will receive no credit**.

**3. Exams.** There will be 3 exams. Exams will cover all material presented up to the exam date. Notice that this class is *very cumulative*. Thus, for instance, the third exam will cover material presented up to the exam date but with emphasis on the material presented after the second exam. The exams cannot be retaken or taken at other than the scheduled time except under the most extreme circumstances, subject to approval from the instructor. Permission must be granted *before* the missed exam.

**You are expected to take the exams on your own laptops**. Thus, you must bring your laptop to the classroom to take the exams. It is your responsibility to have **all the needed programs installed** (i.e., R, RStudio, Internet access).

**4. Final Project.** The final project for the class will ask you to explore some questions using a dataset that I will provide. More instructions will be provided.

**5. Collaboration and Cheating.** Collaboration of any kind is **strictly forbidden** on all homework, exams and the final project. Violations will be reported to Bauer College administration, and result **in severe academic sanction**.

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[1] According to UH guidelines, "Hybrid classes at the University of Houston combine traditional classroom instruction with online class instruction. Hybrid courses have required meetings and meet less than half of the time in a traditional face-to-face classroom environment, with the remainder of the course delivered online."

**6. Contacting the Professor.** The best way to reach me is through email. Please allow one business day for email responses. Thus, if you send a message on Friday evening, you may not hear back until Monday afternoon. Please plan accordingly.

If you find that you have any trouble keeping up with homework or other aspects of the course, make sure you let me know as early as possible. As you will find, building rapport and effective relationships are key to becoming an effective professional. Make sure that you are proactive in informing me when difficulties arise during the semester so that I can help you find a solution.

**GRADING:**

| | |
|---|---|
| Homework 1-6 @5% each | 30% |
| Exam #1 | 10% |
| Exam #2 | 15% |
| Exam #3 | 20% |
| Final Project | 25% |

Final course letter grade follows the numeric-letter grade system shown in the table below.

| Grade | Raw Score | Grade | Raw Score |
|---|---|---|---|
| A | > or =92 | C | > or =74, but <77 |
| A- | > or =89, but <92 | C- | > or =70, but <74 |
| B+ | > or =86, but <89 | D+ | > or =67, but <70 |
| B | > or =83, but <86 | D | > or =63, but <67 |
| B- | > or =80, but <83 | D- | > or =60, but <63 |
| C+ | > or =77, but <80 | F | <60 |

Grades are earned on the basis of performance in this course, not given on the basis of need or effort. Grades will not be rounded up or curved. **For example, if you earn an 85.9999%, you will receive a "B", not a "B+".** No exceptions. NOTE: Grades are not negotiable. I do not reply to email requesting a grade change or extra credit.

**COURSE POLICIES:**

Missed Classes: The student is responsible for obtaining material, which may have been distributed in class when he/she was absent. This can be done through contacting a classmate who was present or by contacting the Professor during her office hours or other times. Missed or late exams cannot be made up under any circumstances unless an official excuse is provided. **Any uncoordinated, unexcused missed exam will result in a score of 0 for that exam.**

Face Covering Policy: To reduce the spread of COVID-19, the University strongly encourages everyone (vaccinated or not) to wear face coverings indoors on campus including classrooms for both faculty and students.

Presence in Class: Your presence in class each session means that you:

- Are NOT exhibiting any Coronavirus Symptoms that makes you think that you may have COVID-19
- Have NOT tested positive or been diagnosed for COVID-19
- Have NOT knowingly been exposed to someone with COVID-19 or suspected/presumed COVID-19

If you are experiencing any COVID-19 symptoms that are not clearly related to a pre-existing medical condition, do not come to class. Please see Student Protocols for what to do if you experience symptoms

and [Potential Exposure to Coronavirus](#) for what to do if you have potentially been exposed to COVID-19. Consult the (select: [Undergraduate Excused Absence Policy](#) or [Graduate Excused Absence Policy](#)) for information regarding excused absences due to medical reasons.

COVID-19 Information: Students are encouraged to visit the University's [COVID-19](#) website for important information including on-campus testing, vaccines, diagnosis and symptom protocols, campus cleaning and safety practices, report forms, and positive cases on campus. Please check the website throughout the semester for updates.

Vaccinations: Data suggests that vaccination remains the best intervention for reliable protection against COVID-19. Students are asked to familiarize themselves with pertinent [vaccine information](#), consult with their health care provider. The University strongly encourages all students, faculty, and staff to be vaccinated.

Reasonable Academic Adjustments/Auxiliary Aids: The University of Houston complies with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, pertaining to the provision of reasonable academic adjustments/auxiliary aids for disabled students. In accordance with Section 504 and ADA guidelines, UH strives to provide reasonable academic adjustments/auxiliary aids to students who request and require them. If you believe that you have a disability requiring an academic adjustments/auxiliary aid, please contact [the Justin Dart Jr. Student Accessibility Center](#) (formerly the Justin Dart, Jr. Center for Students with DisABILITIES).

Excused Absence Policy: Regular class attendance, participation, and engagement in coursework are important contributors to student success. Absences may be excused as provided in the University of Houston [Undergraduate Excused Absence Policy](#) and [Graduate Excused Absence Policy](#) for reasons including: medical illness of student or close relative, death of a close family member, legal or government proceeding that a student is obligated to attend, recognized professional and educational activities where the student is presenting, and University-sponsored activity or athletic competition. Under these policies, students with excused absences will be provided with an opportunity to make up any quiz, exam or other work that contributes to the course grade or a satisfactory alternative. Please read the full policy for details regarding reasons for excused absences, the approval process, and extended absences. Additional policies address absences related to [military service, religious holy days, pregnancy and related conditions](#), and [disability](#).

Recording of Class: Students may not record all or part of class, livestream all or part of class, or make/distribute screen captures, without advanced written consent of the instructor. If you have or think you may have a disability such that you need to record class-related activities, please contact the [Justin Dart, Jr. Student Accessibility Center.](#) If you have an accommodation to record class-related activities, those recordings may not be shared with any other student, whether in this course or not, or with any other person or on any other platform. Classes may be recorded by the instructor. Students may use instructor's recordings for their own studying and notetaking. Instructor's recordings are not authorized to be shared with *anyone* without the prior written approval of the instructor. Failure to comply with requirements regarding recordings will result in a disciplinary referral to the Dean of Students Office and may result in disciplinary action.

Syllabus Changes: Due to the changing nature of the COVID-19 pandemic, please note that the instructor may need to make modifications to the course syllabus and may do so at any time. Notice of such changes will be announced as quickly as possible through.

Academic Dishonesty: Plagiarism and cheating are serious offenses and may be punished by failure on exam, paper or project; failure in course; and or expulsion from the University. For more information, refer to the "Academic Honesty Policy" accessible here (http://www.uh.edu/provost/policies/honesty/). The University of Houston Academic Honesty Policy is strictly enforced by the C. T. Bauer College of Business. No violations of this policy will be tolerated in this course. Students are expected to be familiar with this policy.

Copyright Notice: All materials used within the Blackboard course website are intended for personal, educational purposes only in accordance with the "fair use" clause of copyright. Students may not re-sell any of the materials or use any UH resources (including emails) to advertise the sale of course-related materials. Students may not distribute *any (or part of)* of the materials with *anyone* without permission of the instructor.

**COURSE SCHEDULE:**
**Important:** If necessary, this syllabus will be modified. Any modifications to the syllabus will be posted on the course site and email notification will be distributed to course participants.

| WK | Date | Topics | |
|---|---|---|---|
| 1 | Aug. 26 | Unit 1. Introduction and Set-up (Aug. 26) | Homework 0 |
| 2 | Aug. 30 - Sep. 5 | Unit 2. R Basics and Introduction to Data | |
| 3 | Sep. 6 - 12 | Unit 3. Data Frames | Homework 1 |
| 4 | Sep. 13 - 19 | Unit 4. R Programming Fundamentals | Homework 2 |
| 5 | Sep. 20 - 26 | Review Section # (Sep. 23) | |
| | | Exam #1 (Sep. 30) | |
| 6 | Sep. 27 - Oct. 3 | Unit 5. R Packages and dplyr | |
| 7 | Oct. 4 - 10 | Unit 6. Data Manipulation with dplyr | Homework 3 |
| 8 | Oct. 11 - 17 | Unit 7. Data Visualization with ggplot2 | Homework 4 |
| 9 | Oct. 18 - 24 | Review Section #2 (Oct. 21) | |
| | | Exam #2 (Oct. 28) | |
| 10 | Oct. 25 - 31 | Unit 8. Statistics and Comparison Tests | |
| 11 | Nov. 1 - 7 | Unit 9-A. Correlation and Regression | Homework 5 |
| 12 | Nov. 8 - 14 | Unit 9-B. Multiple Regression | Homework 6 |
| 13 | Nov. 15 - 21 | Review Section #3 (Nov. 18) | |
| 14 | Nov. 24 - 27 | Thanksgiving Holiday – No Class! | |
| | | Exam #3 (Dec. 2) | |
| 15 | Nov. 29 – Dec. 5 | Unit 10. Course Summary | |
| | Dec. 7- 15 | Final Exam Period | Final Project due Dec. 13 |

Note. Course calendar is available on Blackboard. Make sure you keep a copy of it.