# This is the CCAC logo.

# DAT-204 – R for Analytics

# COURSE OUTLINE

**Class Section Time & Location**: Thursdays 6-9:10pm on [Zoom](https://ccac.zoom.us/j/96752452928) & [Slack](https://ccac-data-analytics.slack.com)

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| Instructor: | Coral Sheldon-Hess | | Semester: | | Fall 2020 |
| Office Hours: | Mondays 2-5pm  Wednesdays 3-5pm | | Office Location: | | [Online](https://calendly.com/ccac-csheldon-hess) |
| Instructor Contact Methods: | **Email** (best way to reach me): [csheldon-hess@ccac.edu](mailto:csheldon-hess@ccac.edu)  *Note*: if you need to email me code, either paste it into the message text or save the file with a .txt extension instead of .r  *Note*: emails will receive a reply within one business day  **Set up an appointment:** <https://calendly.com/ccac-csheldon-hess>  **Slack**: <https://ccac-data-analytics.slack.com/>, @coral (post your message in the **#dat-204-r** channel, but feel free to tag me if I don’t reply immediately during class or office hours)  **Phone** (if you leave a message, I’ll hear it and reply within two business days): 412-369-4217 | | | | |
| Department Phone: | 412-369-4107 | Department Chair: | | [Rebecca Elinich DuPont](mailto:relinich@ccac.edu) | |

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| Course Credits: | 3 |
| Pre- / Co-requisites: | DAT 102 and MAT 120 |
| Course Description: | R for Analytics will guide students to the use of the R software platform for data analysis. After exploring the fundamentals of the R scripting language and essential data structures, students will learn to manipulate structured data in R in preparation for statistical analysis. Standard statistical data analysis techniques will be implemented in R such as means testing, variable correlations and linear regressions. In addition to mechanical fundamentals, this course is rooted in building skills in sound data analysis thinking: surveying data sets, generating compelling inquiry questions, conducting rigorous quantitative analysis, drawing conclusions rooted in reproducible findings and discussing the limitations of this analysis with a lay audience. |
| Learning Outcomes  (from master course syllabus): | Upon successful completion of the course, the student will:   1. Execute essential operations in R-Studio including loading and viewing structured data files, reading data into R objects and manipulating data. 2. Choose appropriate data storage objects and configure them for desired analysis processes given structured data in a variety of formats. 3. Generate basic plots and descriptive statistics in R for all relevant variables in a given structured data set. 4. Explain the fundamentals of linear regression analysis and write R scripts to conduct a straightforward regression analysis on a structured data set. 5. Implement an end-to-end data analysis process. 6. Generate exportable plots and reports using Shiny. |

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| Textbook & Materials | **Required textbook: Hands-on Programming with R**, Garret Grolemund. Available free online: <https://rstudio-education.github.io/hopr/>  **Required materials:** Students will need **access to a computer and internet** to attend synchronous sessions (which will also be recorded and made available on Blackboard) and to complete and submit assignments. To complete programming assignments, students will need access to a computer (not a tablet or mobile phone) on which they can install Slack and RStudio (both free). (Note: the instructor will be using RStudio through Anaconda 3.)  Due to COVID-19, there is not a guarantee that CCAC’s campus computer labs will remain open all semester. This is also true for public libraries and other places where computer access outside of the home might be possible. Students should **make a plan for computer and internet access in case of renewed pandemic-related lockdown**.  Students will also need **a set of headphones** and **a microphone input to their computer**. (Headphones with integrated microphone should work on most machines. You can test your computer, headphones, and microphones at <https://ccac.zoom.us/test>)  **Recommended textbook:** *R for Data Science (Wickham) -* <https://r4ds.had.co.nz/> |

Course Policies & Procedures:

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| Evaluation Plan: | Grades are out of 1000 points:  A: 900+  B: 800-899  C: 700-799  D: 600-699  F: 599 or below  The breakdown of scoring is as follows:  Engagement\* 100  Homework assignments: 500 (11 assignments, 50 points apiece, and I drop the lowest)  Final project: 400  Homework assignments are due by the start of class on Thursday. Late assignments will lose 10% per day, and assignments received more than three days late will not be graded. **With prior arrangements**, or in case of medical or family emergency, late assignments may be accepted. The final project is an exception; the only way I can accept that late is with an “Incomplete” grade agreement.  *Bonus points*: Occasionally I may encourage you to (virtually) attend CCAC-sponsored or community activities for bonus points, or I may offer extra points for attempting a more difficult assignment than the default one.  \* Engagement encompasses not only attendance at our live sessions—though that is where attendance falls—but also participation in class discussions on Zoom and Slack. There is a forum set up under “Discussions” on Blackboard, and the Data Analytics Slack has a channel for DAT-204; please, use either or both to help one another! Doing your readings before class, asking questions, answering other students’ questions, showing up to office hours—these are all examples of engagement, as well. |
| Attendance & Tardiness: | If you need to miss our synchronous session occasionally, that is all right; they will be recorded and posted on Blackboard within a day. Attending them live is a *really good idea*, because questions *will* come up as we cover material; having the chance to ask and get clarification in real-time is invaluable. |
| Test/Quiz Makeup: | N/A – no tests or quizzes |
| Technology Use: | Students may use their own computers. Grading is done on the standard CCAC machine setup: Windows 10/Anaconda 3/RStudio; anyone completing homework assignments on a machine configured differently is responsible for making sure their code runs on the standard CCAC machine setup before turning in their assignments. |
| Academic Honesty: | Copying or failure to turn in your own work will result in a score of a zero on the assignment, notification of the department chair, and a required meeting with the instructor or department head. Additional consequences could include failing the course and any other academic consequences the instructor and the department chair deem appropriate.  **If you use external sources for help on your assignments, you are required to document those sources via comments in your code**. If you borrow code from the textbook or from a solution I’ve posted, cite it in a comment, and let me know what you changed. If you get help from another student or a tutor, give them credit in a comment. **Failure to credit any source counts as copying.**  This is not a first-level programming course, so getting a certain amount of help online is acceptable, as long as sources are cited. I expect you will use the official R documentation. |
| Available help: | Tutoring is available via Zoom for all CCAC students – more information at [https://ccac.edu/Learning\_Commons.aspx](https://ccac.edu/Learning_Commons.aspx%20) & [https://ccac.edu/Tutoring/](https://ccac.edu/Tutoring/%20)  Up to 10 hours of online tutoring are available through Smarthinking (accessed via <https://ccac.edu/Tutoring/>)  If you’re having trouble with the course, you’re definitely welcome to use tutoring, but please also feel free to use my office hours. You can make appointments with me via Calendly: <https://calendly.com/ccac-csheldon-hess> |
| Other Policies and Procedures: | In this class we will function as software engineers. We will work individually and together toward stronger software development, communication, project management, and other necessary skills that are required to work in a software development environment. Some of the learning tools we may use include lectures, readings, coding projects, discussions, and workshops.  Just like on a real software engineering team, our goal is for all of us to succeed. We are a community of learners, responsible for one another’s success.  Students should prepare before each class by reading the chapter that will be discussed during the next class period and completing any lab activity and/or homework that is required from the previous class period.  **There will always be homework.** You can’t build programming skills without actually *programming*.  That all said, we are all humans, living through unprecedented times. Your professor is a human and recognizes that so are you. If you aren’t going to be able to turn something in on time, let your professor know *before the day it’s due*, and they will do whatever they can to work with you.  If you or a family member get sick, if your job’s hours change, or something else happens that’s going to put you in danger of not finishing the course by December 12, please reach out—some deadlines can be modified, and, very worst case, we can set up a plan for an “Incomplete” grade, which will allow you to finish the course later. |

All students are expected to read and comply with the policies and regulations set forth in the CCAC Student Handbook, including without limitation the College’s policies regarding academic and behavioral conduct, the procedures for requesting an accommodation based upon a disability, pregnancy or pregnancy related condition, or a religious observance, and for reporting unlawful discrimination and harassment.

The Student Handbook is available to view and download from the College’s website at the following URL:  <https://www.ccac.edu/academic-rules-and-regulations/rules-and-regulations.php>.

The full text of the College’s *Policy Manual,* *Administrative Regulations Manual*, and the Civil Rights Complaint Procedure can also be viewed and downloaded at:  <https://www.ccac.edu/president/policies-and-regulations.php>; <https://www.ccac.edu/diversity/title-IX.php>; and <https://www.ccac.edu/diversity/notices.php>.

Information concerning the process and documentation required to request a disability-related accommodation can be obtained by contacting the campus’ Office of Supportive Services for Students with Disabilities (OSSSD) or by visiting the OSSSD information page at <https://www.ccac.edu/supportive-services/suppotive.php>.

Students are reminded that they can access their course information and CCAC email account, the CCAC Academic Calendar (including add/drop/withdrawal deadlines), the Student Handbook, the College’s Incident Report form, and many other College services through the MyCCAC portal at:  [https://my.ccac.edu](https://my.ccac.edu/).

| Course Plan: | | |
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| Class Week/Date | Topics / Learning Activities | Assignments / Homework | |
| Week 1  *9/3* | Syllabus  Introductions  Intro to Zoom and Slack  Making decisions about the semester  Talking about R’s place in data analytics  RStudio | Read chapter 1 of Grolemund ([Project 1: Weighted Dice](https://rstudio-education.github.io/hopr/project-1-weighted-dice.html) [and The Very Basics](https://rstudio-education.github.io/hopr/basics.html))  Install RStudio | |
| Week 2  *9/10* | R basics – user interface, objects, functions, arguments, scripts | Homework 1  Read chapter 2 of Grolemund ([Packages and Help Pages](https://rstudio-education.github.io/hopr/packages.html)) | |
| Week 3  *9/17* | Packages and Help Pages | Homework 2  Read chapter 3 of Grolemund ([R Objects](https://rstudio-education.github.io/hopr/r-objects.html)) | |
| Week 4  *9/24* | R Objects | Homework 3  Read chapter 4 of Grolemund [(R Notation](https://rstudio-education.github.io/hopr/r-notation.html)) | |
| Week 5  *10/1* | R Notation | Homework 4  Read chapter 5 of Grolemund ([Modifying Values](https://rstudio-education.github.io/hopr/modify.html)) | |
| Week 6  *10/8* | Modifying Values | Homework 5  Read chapter 6 of Grolemund ([Environments](https://rstudio-education.github.io/hopr/environments.html)) | |
| Week 7  *10/15*  *Midterm grades* | Environments | Homework 6  Read chapter 7 of Grolemund ([Programs](https://rstudio-education.github.io/hopr/programs.html)) | |
| Week 8  *10/22* | Programs | Homework 7  Read chapter 9 of Grolemund ([Loops](https://rstudio-education.github.io/hopr/loops.html)) | |
| Week 9  *10/29* | Loops | Homework 8  Read chapter 10 of Grolemund ([Speed/Vectorization](https://rstudio-education.github.io/hopr/speed.html)) | |
| Week 10  *11/5* | Speed & Vectorization | Homework 9  Reading TBD (Wickham?) | |
| Week 11  *11/12* | R Markdown  dplyr  ggplot2 | Homework 10  Reading TBD (Shiny docs?) | |
| Week 12  *11/19* | Shiny | Homework 11  Project proposals | |
| Break  11/23-11/29 | Thanksgiving Break | No new assignments over break, but you may want to work on your project! | |
| Week 13  12/3 | Final project work time | Finish your final project and turn it in by 6pm on 12/10/20 | |
| Week 14  *12/10* | Final Projects | Final project sharing over Zoom | |

Course Outline Corrections:

During the semester/session, reasonable changes to the course outline may be academically appropriate. Students will be notified of these adjustments by the instructor in a timely manner.