DSC 105 Syllabus

DSC105 Introduction to Data Science - Syllabus Fall 2022

Marcus Birkenkrahe

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Contents

1 General Course Information

- Meeting Times: Mon-Wed-Fri from 11:00-11:50 am

- Meeting place: Derby Science Building Computer Lab 209

- Professor: Marcus Birkenkrahe

- Professor's Office: Derby Science Building 210

- Phone: (870) 307-7254 (office) / (501) 422-4725 (private)

- Office hours: Monday through Friday after class (see Canvas)

- Textbook: The Book of R (Part I, ch. 1-8) by T Davies (NoStarch, 2016)

2 Objectives

Data science is concerned with getting data to work for us, to give us its (presumed) hidden treasures. Data science has been called "the sexiest job of the 21st century". Even if you don't want to become a professonial data scientist, it's helpful to master the basic concepts if you want to succeed in today's data-driven business.

This course focuses on data science basics, simple visualization and productivity tools.

3 Target audience

The course is for anyone who is interested in becoming more data literate in their own field of interest - be it languages, theatre, biology, psychology or exercise science - and growing their personal skill stack.

Visualization of data-driven insights and improved productivity when working with data and media is a concern for any professional.

4 Student Learning Outcomes

Students who complete "Introduction to data science" (DSC 105) will be able to:

- Learn computer and data science principles by playing with data

- Acquire basic statistical programming skills using R

- Apply literate programming principles to their work with Org-mode

- Use infrastructure including command line, Emacs, and GitHub

- Understand the relationship of humans, machines, and data

- Develop their critical thinking skills

- Know how to effectively present assignment and project results

Students, who complete DSC 105 will have fulfilled the prerequisites for DSC 205, Introduction to advanced data science, which focuses on coding, data science on the command line, and R packages.

5 Course requirements

No prior knowledge required. Some knowledge of, and experience with computers is useful but not critical. Curiosity is essential. You will gain data literacy skills by taking this course. The course will prepare you for further studies in computer and data science, or in other disciplines that use modern computing, i.e. every discipline, from accounting to zoology).

6 Grading system

The table lists course requirements, number of units (classroom sessions), points-per-unit (PPU), total points per requirement, and the impact of a requirement on your total grade.

You should be able to see your current grade at any time using the gradebook for the course.

REQUIREMENT	UNITS	PPU	TOTAL	% of TOTAL
Quizzes	13	10	130	28.571429
Assignments	15	10	150	32.967033
Classwork	15	5	75	16.483516
Sprint review	3	20	60	13.186813
Exam	1	40	40	8.7912088
TOTAL			455	100.000000

7 Grading table

This table is used to convert completion rates into letter grades. For the midterm results, letter grades still carry signs, while for the term results, only straight letters are given (by rounding up).

%	MIDTERM GRADE	FINAL GRADE	POINTS
100-98	A+		
97-96	A	A (passed -	
95-90	A-	very good)	409.5
89-86	B+		
85-80	B	B (passed -	
79-76	B-	good)	345.8
75-70	C+		
69-66	C	C (passed -	
65-60	C-	satisfactory)	273.
59-56	D+		
55-50	D	D (passed)	227.5
49-0	F	F (failed)	

8 (Revision) Quizzes

- Complete before coming to class

- Recall last chapter or section of class

- Read relevant textbook chapters

9 (Programming) Assignments

- Complete DataCamp lessons

- Complete assignments outside of class

- Be ready to present your solutions

10 Classwork / attendance

- Complete assignments in class (participation)

- Upload completed assignments (homework)

- Be ready to present your results in class

11 (Project) sprint review

- Research exploratory data analysis project

- Apply agile project management methods

- Present your results during 3 sprint reviews

12 Final exam

- Final exam sourced from the quizzes only

- Multiple choice questions only

- Online exam taken in the classroom

13 Standard Policies

Honor Code

All graded work in this class is to be pledged in accordance with the Lyon College Honor Code. The use of a phone for any reason during the course of an exam is considered an honor code violation.

Class Attendance Policy

Students are expected to attend all class periods for the courses in which they are enrolled. They are responsible for conferring with individual professors regarding any missed assignments. Faculty members are to notify the Registrar when a student misses the equivalent of one, two, three, and

four weeks of class periods in a single course. Under this policy, there is no distinction between "excused" and "unexcused" absences, except that a student may make up work missed during an excused absence. A reminder of the college's attendance policy will be issued to the student at one week, a second reminder at two weeks, a warning at three weeks, and notification of administrative withdrawal and the assigning of an "F" grade at four weeks. Students who are administratively withdrawn from more than one course will be placed on probation or suspended.

Disabilities

The Morrow Academic Center (MAC) helps students who want to improve grades by providing peer-led services including Supplemental Instruction (SI), tutoring, the Writing Center, and academic coaching as well providing 24-hour, online tutoring for all subjects through Tutor.com. A schedule of peer-led services is available at lyon.edu/mac and Tutor.com is accessed through courses in Schoology. Contact Donald Taylor, Director of Academic Support, at 870-307-7319 or donald.taylor@lyon.edu for more information about MAC services.

Technology Support

For general technology support, you can contact the IT department by emailing support@lyon.edu or by calling 870-307-7555. For assistance with classroom-related technologies, such as the learning management system (LMS), you can request support using the methods above, or you can contact sarah.williams@lyon.edu directly for assistance. Your course content will be accessible digitally using either the Schoology or Canvas LMS. Both LMS platforms will use your myLyon credentials for your student login.

- For Canvas, login at lyon.instructure.com

- For Schoology, login at lyon.schoology.com

Disabilities

Students seeking reasonable accommodations based on documented learning disabilities must contact Interim Director of Academic Support Donald Taylor in the Morrow Academic Center at (870) 307-7019 or at donald.taylor@lyon.edu.

Harassment, Discrimination, and Sexual Misconduct

Lyon College seeks to provide all members of the community with a safe and secure learning and work environment that is free of crime and/or policy violations motivated by discrimination, sexual and bias-related harassment, and other violations of rights. The College has a zero-tolerance policy against gender-based misconduct, sexual assault, and interpersonal violence toward any member or guest of the Lyon College community. Any individual who has been the victim of an act of violence or intimidation is urged to make an official report by contacting a campus Title IX coordinator or by visiting www.lyon.edu/file-a-title-ix-report. A report of an act of violence or intimidation will be dealt with promptly. Confidentiality will be maintained to the greatest extent possible within the constraints of the law. For more information regarding the College's Title IX policies and procedures, visit www.lyon.edu/title-ix.

Mental & Behavioral Health

Lyon College is dedicated to ensuring each student has access to mental and behavioral health resources. The College's Mental and Behavioral Health Office is located in Edwards Commons and is partnered with White River Health System's Behavioral Health Clinic. The office is committed to helping the Lyon community achieve maximum mental and behavioral wellness through both preventative and reactive care. A full-time, licensed, professional counselor provides counseling, consultations, outreach, workshops, and many more mental and behavioral services to Lyon students, faculty, and staff at no cost. The Mental and Behavioral Health Office also provides access to White River Health System's services and facilities, including medication management and in-patient and out-patient care. To make an appointment, contact counseling@lyon.edu.

College-Wide COVID-19 Policies for Fall, 2022

The College does not require masks in instructional and meeting spaces inside academic buildings. However, if instructors require masks in their classroom, lab, or studio, then students and guests must comply with that requirement. Vaccines are strongly encouraged for all faculty, staff, and students. Vaccines are not mandated for Lyon College community members, although there may be specific courses involving interactions with vulnerable, external populations where a vaccine may be required. The College will continue to offer symptomatic testing for students, faculty and staff.

Details

Details specific to this course may be found in the subsequent pages of this syllabus. Those details will include at least the following:

- A description of the course consistent with the Lyon College catalog.

- A list of student learning outcomes for the course.

- A summary of all course requirements.

- An explanation of the grading system to be used in the course.

- Any course-specific attendance policies that go beyond the College policy.

- Details about what constitutes acceptable and unacceptable student collaboration on graded work.

- A clear statement about which LMS is being used for the course.

14 Learning Management System (LMS)

We will use Canvas in this course (lyon.instructure.com/courses/568).

15 Assignments and Honor Code

There will be several assignments during the summer school, including programming assignments and multiple-choice tests. They are due at the beginning of the class period on the due date. Once class begins, the assigment will be considered one day late if it has not been turned in. Late programs will not be accepted without an extension. Extensions will **not** be granted for reasons such as:

- You could not get to a computer

- You could not get a computer to do what you wanted it to do

- The network was down

- The printer was out of paper or toner

- You erased your files, lost your homework, or misplaced your flash drive

- You had other coursework or family commitments that interfered with your work in this course

Put "Pledged" and a note of any collaboration in the comments of any program you turn in. Programming assignments are individual efforts, but you may seek assistance from another student or the course instructor. You may not copy someone else's solution. If you are having trouble finishing an assignment, it is far better to do your own work and receive a low score than to go through an honor trial and suffer the penalties that may be involved.

What is cheating on an assignment? Here are a few examples:

  - Having someone else write your assignment, in whole or in part
  - Copying an assignment someone else wrote, in whole or in part
  - Collaborating with someone else to the extent that your submissions are identifiably very similar, in whole or in part
  - Turning in a submission with the wrong name on it
    What is not cheating? Here are some examples:

    * Talking to someone in general terms about concepts involved in an assignment
    * Asking someone for help with a specific error message or bug in your program
    * Getting help with the specifics of language syntax or citation style
    * Utilizing information given to you by the instructor

  Any assistance must be clearly explained in the comments at the beginning of your submission. If you have any questions about this, please ask or review the policies relating to the Honor Code.
  Absences on Days of Exams:
  Test "make-ups" will only be allowed if arrangements have been made prior to the scheduled time. If you are sick the day of the test, please e-mail me or leave a message on my phone before the scheduled time, and we can make arrangements when you return.

16   Attendance policy

In accordance with college policy, you must attend a minimum of 80% of non-cancelled meetings without risking a fail. This means that you must

attend a minimum of 32/40 meetings. If you miss more than 8 meetings, you fail the class automatically. Any missed meetings result in an "Early Alert" report.

You should take care not to miss consecutive sessions if at all possible - otherwise you risk losing touch with the class and falling behind.

17   Important term dates

WHEN	WHAT
August 16	Classes begin
August 29	Last day to drop course
September 5	Labor day (no classes)
October 1-4	Fall break (no classes)
October 6	Mid-term grades due
October 14-26	Sesquicentennial week
October 20	Service day (no classes)
November 23-27	Thanksgiving break (no classes)
December 2	Last day of classes
December 4-9	Final exams
December 14	Final grades due

18   Classroom sessions schedule

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[1]First chapter of "Data Visualization in R" by Ron Pearson, DataCamp
[2]First chapter of "Introduction to Data Visualization with ggplot2", DataCamp

NO	DATE	TESTS	ASSIGNMENT	TEXTBOOK
1	Wed-17-Aug		1 DS intro [DC]	1 Getting started
2	Fri-19-Aug		2 Emacs tutorial	
3	Mon-22-Aug	Quiz 1	3 Intro to basics [DC]	2 R for basic math
4	Wed-24-Aug			
5	Fri-26-Aug			
6	Mon-29-Aug	Quiz 2	4 Vectors [DC]	2.3 Vectors
7	Wed-31-Aug		Sprint review	
8	Fri-02-Sep			
9	Wed-07-Sep	Quiz 3	5 Matrices [DC]	3 Matrices and Arrays
10	Fri-09-Sep			
11	Mon-12-Sep	Quiz 4	6 Logical subsetting	4.1 Logical values
12	Wed-14-Sep			
13	Fri-16-Sep			
14	Mon-19-Sep	Quiz 5	7 String manipulation	4.2 Characters
15	Wed-21-Sep			
16	Fri-23-Sep			
17	Mon-26-Sep	Quiz 6	8 Factors [DC]	4.3 Factors
18	Wed-28-Sep			
19	Fri-30-Sep		Sprint Review	
20	Wed-05-Oct	Quiz 7	9 Lists [DC]	5.1 Lists
21	Fri-07-Oct			
22	Mon-10-Oct	Quiz 8	10 Data frames [DC]	5.2 Data Frames
23	Wed-12-Oct			
24	Fri-14-Oct			
25	Mon-24-Oct	Quiz 9	11 Coercing data structures	6 Special values,
26	Wed-26-Oct			Classes, and
27	Fri-28-Oct			Coercion
28	Mon-31-Oct	Quiz 10	12 Quick intro [DC][1]	7 Basic plotting
29	Wed-02-Nov			
30	Fri-04-Nov			
31	Mon-07-Nov	Quiz 11	13 Intro to ggplot [DC][2]	7.4 ggplot2
32	Wed-09-Nov			
33	Fri-11-Nov			
34	Mon-14-Nov	Quiz 12	14 Reading Excel sheets	8.2 Reading data
35	Wed-16-Nov			
36	Fri-18-Nov			
37	Mon-21-Nov	Quiz 13	15 Writing graphical data	8.3 Writing data
38	Mon-28-Nov		Sprint review	
39	Wed-30-Nov		Sprint review	
40	Fri-02-Dec		Sprint review	