DSC 101 Fall 2021 Syllabus

Lyon College Data Science Program

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1 General Course Information

- Meeting Times: Tuesday & Thursday, 13:00-14:15 hrs
- Meeting place: Derby 209 (CS research lab)
- Professor: Marcus Birkenkrahe
- Office: Derby 210
- Phone: (501) 422-4725
- Office hours: Mon/Wed/Fri 10:00-10:30 AM; Tue/Thu 4-4:30 PM
- Text: *The Art of R Programming - A Tour of Statistical Software Design*, by Norman Matloff, NoStarch Press (2011).

1.1 Objectives

Data science is about how to get data to work for us, to give us its hidden treasures. Data science has been called "the sexiest job of the 21st century". Even if you don't want to become a professional data scientist, it's helpful to master the basic concepts if you want to succeed in today's highly data-driven business environment. This courses focuses on: data science basics, visualization and productivity tools. The course is for everyone who is interested in becoming more data literate and growing their skill stack. Besides short, synchronous lectures and practice sessions, you can learn from weekly quizzes, exercises and a plethora of other, custom-built online materials.

1.2 Student Learning Outcomes

Students who complete DSC101 are able to:

- Organize data visually in a way that is clear and informative
- Find and use data sets from the real world
- Easily and quickly format data into graphs
- Understand and present statistical information
- Understand how modern productivity tools can help you
- Complete an exploratory data analysis project in small steps

1.3 Course requirements

No prior knowledge required. Both the necessary programming and statistical concepts are introduced in the course using examples and simple mini-projects. Previous programming experience is useful but not mission-critical. Curiosity is essential. You will gain data literacy skills by taking this course.

1.4 Grading system

When	Description	Impact	Graded
Weekly	DataCamp assignment	15%	No
Weekly	Weekly tests	15%	No
Last week	Project presentation	30%	Yes
TBD	Final exam	40%	Yes

1.4.1 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
100-98	A+	
97-96	A	A
95-90	A-	
89-86	B+	
85-80	B	B
79-76	B-	
75-70	C+	
69-66	C	C
65-60	C-	
59-56	D+	
55-50	D	D
49-0	F	F

1.4.2 DataCamp assignments (15%)

Chapters of several DataCamp courses will be assigned to you. To complete a chapter takes 20-30 minutes per week. If you complete these courses, you get data science certificates that you can add to your resume (or to career management portals like LinkedIn - see my LinkedIn profile for an example), or frame and put them on your wall. Your DataCamp assignment completion rate will enter the final grade cumulatively.

1.4.3 Tests (15%)

There will be 30 short multiple choice tests of 5 questions per week. Your grade will be computed from your average completion rate over all tests.

1.4.4 Project presentation (30%)

In the last week, you present the results of an agile explorative data analysis (EDA) team project. We use the agile Scrum methodology throughout the term, which means that you will present prototype results during four sprint reviews (about once every four weeks), the last of which is the final product or project presentation.

Note that only the final presentation will be graded according to the grading table. Detailed grading criteria for the presentation will be given in class in the form of a rubric.

1.4.5 Exam (40%)

The final exam will consist of a subset of the weekly test questions, possibly with some slight variations to make it more interesting. The basic idea is that you can use the tests to prepare yourself for the exam. The completion rate of the final exam will enter the final grade according to the grading table.

1.5 Grading examples

1.5.1 Example - Midterm grade

At midterms, student X has achieved the following results:

Grade part	Weight	Result
Tests	15%	72%
DataCamp assignment	15%	100%

Student X's midterm result is a "B+" (`86%`).

1.5.2 Example - Final grade

After the finals, student X has achieved the following results:

Grade part	Weight	Result
Tests	15%	72%
DataCamp assignment	15%	100%
Project presentation	30%	95%
Final exam	40%	90%

Student X's midterm result is an "A" (`90.3%`).

2 Standard Policies

2.1 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.

2.2 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.

2.3 Disabilities

Students seeking reasonable accommodations based on documented learning disabilities must contact Danell Hetrick in the Morrow Academic Center at (870) 307-7021 or at danell.hetrick@lyon.edu.

2.4 Harassment, Discrimination, and Sexual Misconduct

Title IX and Lyon's policy prohibit harassment, discrimination and sexual misconduct. Lyon encourages anyone experiencing harassment, discrimination or sexual misconduct to talk to Lai-Monte Hunter, Title IX Coordinator and Vice-President for Student Life, or Sh'Nita Mitchell, Title IX Investigator and Associate Dean for Residence Life, about what happened so they can get the support they need and Lyon can respond appropriately. Lyon is legally obligated to respond to reports of sexual misconduct, and therefore we cannot guarantee the confidentiality of a report, unless made to a confidential resource (Chaplain, Counselor, or Nurse). As a faculty member, I am required to report possible Title IX violations and must provide our Title IX coordinator with all relevant details. I cannot, therefore, guarantee confidentiality.

2.5 College-Wide COVID-19 Policies for Fall, 2021

Masks are mandated for all students in classrooms, laboratories and studios. They remain optional for all persons on the Lyon campus in all other locations and outside. Participation in community surveillance testing in

mandatory. Vaccines are STRONGLY encouraged for all faculty, staff, and students. Vaccines are NOT MANDATED for Lyon College community members.

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.

3 Course specific information

3.1 Assignments and Honor Code

There will be numerous assignments during the semester - programming, lessons, tests, and sprint reviews. 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 me. 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 program, in whole or in part
- Copying a program someone else wrote, in whole or in part
- Collaborating with someone else to the extent that your programs are identifiably very similar, in whole or in part
- Turning in a program 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
- Utilizing information given to you by the instructor

Any assistance must be clearly explained in the comments at the beginning of your program. 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.

3.2 Important Dates:

Date	Description
August 30	Last day to drop w/o record of a course
September 6	Labor day (no classes)
October 2-5	Fall break (no classes)
October 6	Mid-semester grade reports due
October 13	Last day to drop a course with a "W" grade
October 20	Service day on campus (no classes)
Nobember 24-28	Thanksgiving Break (no classes)
December 3	Last day of class
December 6-10	Final exams
December 15	Final grades due

3.3 Schedule and session content

Date	Lectures	DataCamp
17-Aug	**Course overview**	
19-Aug	**Data science overview**	Intro to Basics
24-Aug	**The R shell**	
26-Aug	**The R environment**	Vectors
31-Aug	**Vectors**	
2-Sep	**Data frames**	Matrices
7-Sep	**Factor vectors**	
9-Sep	**Lists in R**	Factors
14-Sep	**`Nile` exploration**	
16-Sep	**Visualization**	Data frames
21-Sep	**Base R graphics**	
23-Sep	**Literate Programming**	Lists
28-Sep	Iteration I	
30-Sep	Fibonacci series	Conditionals
7-Oct	Conditions	Loops
12-Oct	EDA example I	
14-Oct	Linear regression I	Functions
19-Oct	Object-orientation	
21-Oct	EDA example II	The apply family
26-Oct	Packages	
28-Oct	Grammar of Graphics	Base R graphics
2-Nov	Functional Programming	
4-Nov	Text mining I	Different plot types
9-Nov	Text mining II	
11-Nov	Linear regression II	Adding details to plots
16-Nov	Dates and times	
18-Nov	Coding style	How much is too much
23-Nov	Logistic regression	
30-Nov	Team presentations	Plot customization
2-Dec	Team presentations	