DSC 482.01 Fall 2021 Syllabus

Data Modeling

Marcus Birkenkrahe

September 2, 2021

1 General Course Information

- Meeting Times: Tuesday & Thursday, 14:30-15:45 hrs
- Meeting place: Derby 209
- Professor: Marcus Birkenkrahe
- Office: Derby 210
- Phone: (870) 307-7254
- Office hours: Mon/Wed/Fri 10:00-10:30 AM; Tue/Thu 4-4:30 PM
- Text: *Model Thinking: What You Need To Make Data Work For You*, by Scott E. Page, Reprint edition, Basic Books (March 16, 2021). (Amazon)

1.1 Objectives

Models are abstractions that explain parts of the real world, e.g. to address, if not solve, complex problems like climate change, pandemics, or space exploration. Since the real world is only accessible to us through observation, observable data are key to building, verifying and using models. To support decision-making, data and processes are mined and modeled. In this course, we will explore model thinking and a wide array of data and process modeling tools. This special topic seminar is for everyone who is interested in using models and modeling languages to better understand the challenges and achievements of modeling.

1.2 Student Learning Outcomes

Students who complete DSC 482.02 are able to:

- Understand data and process modeling challenges
- Use a variety of modeling languages to create models
- Make use of different modeling software environments
- Understand, and can present current modeling research
- Apply modeling tools to an area of their knowledge
- Write a scientific (IMRaD) essay on modern modeling methods

1.3 Course requirements

No prior knowledge required. Experience and knowledge of data or process modeling methods (e.g. Entity Relationship Diagrams, or Unified Modeling Language) is useful but not critical. Curiosity and active participations, especially during classroom presentations and discussion, is important. You will gain advanced data and process literacy skills by taking this course.

1.4 Grading system

WHEN	DESCRIPTION	IMPACT
TBD	Final exam	40%
Last week	Final essay	30%
Weekly lab	Practice	15%
Weekly lab	Participation	15%

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 Final exam (30%)

- Complete multiple choice questions
- Question examples at the start of a new week
- Open book exam, 120 minutes

1.4.3 Final essay (40%)

- Review a book based on a model or method, OR
- Review an research article based on a model or method, OR
- Apply model(s) or method(s) to an area of your knowledge
- Essay length: 5-10 pages (2,500 - 5,000 words) not counting references.

1.4.4 Weekly practice (15%)

- Create a glossary of technical terms & present, AND
- Connect session content to personal domain knowledge, AND
- Complete set lab exercises in class

1.4.5 Weekly participation (15%)

- Participate in group discussions, OR
- Participate in class discussion, OR
- Present a glossary term, OR
- Present a personal model application

1.4.6 Grading examples

1. Example - Midterm grade

   At midterms, student X has achieved the following results:

GRADE PART	WEIGHT	RESULT
Weekly practice	15%	80%
Weekly participation	15%	90%

   Student X's midterm result is a "B" (`85%`).

2. Example - Final grade

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

GRADE PART	WEIGHT	RESULT
Final exam	30%	95%
Final essay	40%	95%
Weekly practice	15%	80%
Weekly participation	15%	90%

   Student X's midterm result is an "A" (`92%`).

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 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.

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

- Mini lectures on given topics are followed by discussion
- Lab sessions involve in-class exercises and challenges
- There's a short test at the beginning of every week
- There's not one text book for all class topics
- Bring articles, models, applications to class for discussion

DATE	LECTURES/GLOSSARY/LABS	PROJECT
17-Aug	Course overview & purpose	
19-Aug	Many-model thinking (lab)	
24-Aug	Why model?	
26-Aug	Why model? (lab)	
31-Aug	Many-model science	
2-Sep	Many-model science (lab)	
7-Sep	Modeling human actors	
9-Sep	Modeling human actors (lab)	1st sprint review
14-Sep	Process management & EPCs	
16-Sep	Process management & EPCs (lab)	
21-Sep	Business Process Model and Notation	
23-Sep	BPMN (lab)	
28-Sep	Performance management & Analytics	
30-Sep	PM & Analytics (lab)	
7-Oct	Distribution models (lab)	2nd sprint review
12-Oct	Linear models	
14-Oct	Linear models (lab)	
19-Oct	Agile management	
21-Oct	Agile management (lab)	
26-Oct	Models of value and power	
28-Oct	Models of value and power (lab)	
2-Nov	Unified Modeling Language (UML)	
4-Nov	UML (lab)	3rd sprint review
9-Nov	Robotic process automation (RPA)	
11-Nov	RPA (lab)	
16-Nov	Non-linear models	
18-Nov	Non-linear models (lab)	
23-Nov	Process mining	
30-Nov	COVID-19 models	
2-Dec	Summary and outlook	4th sprint review