

DSC 450 Spring 2024 Syllabus

Independent Undergraduate Research (DSC 450) Spring 2024

Marcus Birkenkrahe

January 14, 2024

1 General Course Information

- Meeting Times: weekly (TBD)
- Meeting place: Derby Science Center Room 209
- Professor: Marcus Birkenkrahe
- Office: Derby Science Building 210
- Phone: (870) 307-7254 (office) / (501) 422-4725 (private)
- Office hours: Mon/Wed/Fri 10-10:50 am & 3-3.50 pm, Tue/Thu

2 Standard and course policies

Standard Lyon College Policies are incorporated into this syllabus and can be found at: lyon.edu/standard-course-policies.

The **Assignments and Honor Code** and the **Attendance Policy** are incorporated into this syllabus also and can be found at: tinyurl.com/LyonPolicy.

3 Objectives

1. Develop Advanced Analytical Skills: Enhance understanding of complex data science concepts and techniques.
2. Promote Independent Research: Foster the ability to conduct self-guided, in-depth research in data science.

3. Apply Theoretical Knowledge Practically: Translate theoretical data science knowledge into practical applications and problem-solving.
4. Critical Thinking and Analysis: Cultivate critical thinking skills in analyzing and interpreting data.
5. Communication of Data Insights: Improve skills in effectively communicating complex data insights.
6. Ethical Understanding: Develop an awareness of ethical considerations in data science practices.
7. Project Management Skills: Enhance abilities in managing a data science project from conception to completion.
8. Professional Preparedness: Prepare for professional roles in the data science field.

4 Student Learning Outcomes

Students who complete DSC 450 will be able to

- demonstrate proficiency in applying advanced data science methods and tools.
- Successfully complete a comprehensive research project, showcasing the ability to work independently.
- Exhibit the ability to solve complex, real-world problems using data-driven approaches.
- Clearly communicate data findings and implications to diverse audiences through written reports and presentations.
- Display an understanding of ethical issues and responsible data use in their research and analyses.
- Demonstrate the ability to effectively plan, execute, and manage a data science project.
- Show adaptability and continuous learning in response to emerging data science trends and technologies.
- Demonstrate readiness for entering the professional world of data science through developed skills and knowledge.

5 Course requirements

No formal requirements. Relevant skills for independent research are assumed - these skills can be obtained by completing projects in previous courses in any subject.

Data science is an interdisciplinary field - data science research does not have to include programming or mathematics and statistics but it relies on at least beginning competence in a domain area.

6 Grading system

WHAT	WEIGHT
Participation	25%
Sprint reviews	25%
Final Presentation	25%
Paper/report/notebook	25%

Notes:

- To pass: 60% of all available points.
- Details on the reviews, presentation and final deliverable in class.

7 Schedule and session content

For **important dates**, and for holidays, see the 2023-2024 Academic Calendar at catalog.lyon.edu.

Schedule:

WEEK	TOPIC
1	Introduction (IMRAD)
2	Journal club
3	1st sprint review: proposal
4	Journal club
5	
6	2nd sprint review: methodology
7	
8	Journal club
9	3rd sprint review: results
10	
11	
12	Journal club
13	
14	Final presentations
15	Final presentations
16	Final presentations

Workload: approx. 5 hours per week.

1. Class time = $16 * 1 * 50/60 = 13$
2. Prepare sprint reviews = $4 * 5 = 20$
3. Independent research = $16 * 3 = 48$