

Data Science Project Course Syllabus Academic Year 2026-2027

General Course Information

Course code: BSE 686
Credit Hours: 12
Course Duration: 52 weeks

Pre-requisites: All students must successfully pass clerkship curricular elements and the IDEA Projects Course to progress to the Data Science Project Course. Please refer to [APS-6-Promotion and Graduation Requirements in the CIMED Student Handbook](#).

Course Administration

Position	Personnel	Email
Course Director:	Charles Blatti	blatti@illinois.edu
Course Director:	Ruoqing Zhu	rqzhu@illinois.edu
Course Director:	David Lovinger	David.Lovinger@carle.com
Course Coordinator:	Michael Martin	Mpmartn2@illinois.edu
Course Coordinator:	Vasanth Chandrasekaran	vc28@illinois.edu

Course Goal and Objectives

Carle Illinois Educational Program Objectives (EPOs) consist of competencies and measurable objectives that the college deems essential for graduation. The full text of Carle Illinois EPOs can be accessed here: <https://medicine.illinois.edu/academics/curriculum/core-competencies-and-objectives>.

Goal: The Data Science Project (DSP) course is a year-long exploratory course where students can engage in a data-focused health-related project of their own design. Students will be asked to form teams of two each with at least one faculty guidance mentor. Through multiple phases, the teams will incrementally complete a journal-style, data analytic-focused technical report and present their findings to clinical/engineering audiences.

Course Specific Objectives: Each Course objective listed below has been mapped with relevant Carle Illinois EPOs and is available within our electronic evaluation system. By the end of the Data Science Projects Course, students should be able to:

Course Objective	CI MED Core Competency	EPOs
DSPC01. Design and execute a well-motivated and substantive data science project, including comprehensive data analysis and interpretation	14 Design-based Scientific Reasoning & Scholarship	14.2

DSPC02. Apply and evaluate core principles of data science within a medical or healthcare context	14 Design-based Scientific Reasoning & Scholarship	14.3
DSPC03. Analyze and synthesize findings from the project to draw meaningful connections to clinical translation and medical practice	11 Evidence-based Practice 14 Design-based Scientific Reasoning & Scholarship 15 Quantitative Reasoning, 16 Leadership & Innovation	11.2, 14.3, 15.1, 16.2
DSPC04. Assess and explain the infrastructure, scalability, and system-level challenges of implementing data science in medicine	14 Design-based Scientific Reasoning & Scholarship 15 Quantitative Reasoning	14.1, 15.1
DSPC05. Demonstrate and reflect on the practical and ethical considerations involved in applying data science methods to medical data	14 Design-based Scientific Reasoning & Scholarship	14.1
DSPC06. Practice how to best provide and respond to meaningful guidance from experienced mentors and peers with emphasis on how to think critically, lead, and communicate issues relating to data analysis	14 Design-based Scientific Reasoning & Scholarship 16 Leadership & Innovation	14.1, 16.1

General Student Expectations

- Students are expected to display professional behavior, attitudes, and personal characteristics consistent with the standards expressed in [APS4-Statement on Student Professionalism policy](#).
- Students are expected to complete all required reading and preparatory material prior to the specified clinical or didactic activity.
- Students are expected to engage with the course Canvas page to identify required activities and assignments. Students must attend all required clinical and course sessions.
- Students are expected to complete and submit end of course evaluations and faculty performance evaluations ([APS47-Evaluation Completion and Confidentiality Policy](#)).

Overview of Content

Timeframe (dates available in Canvas)

- Phase I: Team Formation, Clinical Questions, Possible Data Sets, Literature & Methods Review
- Phase II: Dataset Characteristics and Project Proposal
- Phase III: Initial Analysis Results and Project Developments
- Phase IV: End-to-End Draft Analysis Results
- Phase V: Final Project Submissions

Required Experiences: The Data Science Project is largely self driven. However, there are a few times throughout the course that will require your attendance.

Progress Presentation/ Discussions (Phases II-V):

Each one-hour Zoom session will focus on three projects with twenty minutes allocated to each project. Course staff and all students and mentors from the three teams will be encouraged to attend, share their video, and engage in the discussion throughout. Each team is required to present on the progress of their project, respond to any previous feedback given, and future plans to complete the objectives for the current phase. Additionally, attendees of the session are required to engage in a discussion for other

project teams' presentations.

Required Assignments

Phase Reports:

For each phase, your team is expected to author a written report. This report will be iteratively refined over the phase of the course, eventually taking the form of a medical journal or technical report submission.

Phase Peer Evaluations:

For each Phase, each student will be assigned reports of your peers to review and provide valuable feedback. The purpose of this exercise is to give reviewers exposure to the efforts and outputs of other teams and exercise the ability to read and think critically about analyses in other domains presented to them and practice communicating their questions or suggestions. For the teams reviewed, this provides additional outside perspectives on the presentation and direction of their project that they have the chance to consider and respond to.

Final Project Presentation/ Final Presentation Poster:

In Phase V, the Data Science Projects Course will simulate a medical conference Research competition. Each team will submit the Final Project Poster and a video recording of their Final Project Presentation describing the significance, novelty, methods, findings, and impact of their data analysis project. These submissions will be judged by their peers and by the course instructors. Top projects will be offered an opportunity to present at Capstone Innovation Day. The Final Project Presentation recording must be 15-20 minutes of your team clearly explaining your project to a general audience that includes a mixture of clinicians, data scientists, biomedical researchers and scientists from related areas. The project poster for your project must be for a mostly stand alone, first-time viewing general science audience, as if at a scientific conference.

Final Project Report:

The Final Project Report is the culmination of your Data Science Project in the format of a technical/medical journal publication. The final report should be re-edited into a single coherent narrative that describes the significance, novelty, methods, findings, and impact of the data analysis project so that artifacts from previous phases do not stand out. The final report should convey the clinical significance of your overall project, the final conclusions you were able to reach, and the possible translational path for your work to impact clinical practice.

Attendance and responsibilities

All Course experiences are required. Any absence must be recorded via the absence request system. For absences with less than 24 hours notification, in addition to following the policy guidelines, please get in touch with your attending, the Course Coordinator, and the Course Directors. Excused absences will be made up as deemed appropriate by the Course Director. Please refer to the following policies in the CI MED Student Handbook:

- [APS-7 – Attendance, Absence, and Vacation](#)
- [APS-9 – Leave of Absence](#)
- [APS-35 – Scheduled Assessment Completion](#)

Assessment and Evaluation

Methods

- **Formative assessment and feedback:** Feedback will be provided to the students throughout the course. The purpose of the feedback is to identify strengths and areas for improvement.
 - **Phase Presentation/Discussion:** Each Phase, formative feedback for each project will be provided from peers, mentors, and course directors via discussions conducted during the Phase Presentation/Discussion session.
 - **Peer Evaluations:** Each Phase, students will be tasked with providing feedback to their peers' projects.
- **Summative assessment and feedback:**
 - **Phase Reports:** Feedback on your phase report will be provided by at least one course director, your mentor, and the peers assigned to assess your project. Each report is assessed by criteria found on Canvas.
 - **Final Presentation:** Feedback on your final presentation will be provided by at least one course director, your mentor, and the peers assigned to assess your project. The Final Presentation is assessed by criteria found on Canvas.
 - **Final Poster:** Feedback on your final poster will be provided by at least one course director, your mentor, and the peers assigned to assess your project. Each Final Poster is assessed by criteria found on Canvas.
 - **Final Report:** Feedback on your Final Report will be provided by a course director and mentor. Each Final Report is assessed by criteria found on Canvas.

Course Grade Summary

Students must pass each phase of the course to receive a Satisfactory grade. All assignment due dates are posted on Canvas. Any assignments submitted late are subject to a penalty of a 20% reduction of the assignment's maximum points. To be eligible for a Satisfactory grade, you will need to submit all missing assignments and course requirements by the Friday following the conclusion of the course at 5:00 pm. After that time, any work turned in after that time will be reviewed by the Course Directors and a remediation plan will be drafted. The Course Director reserves the right to issue an "Unsatisfactory" grade for the Course.

Course Element	Criteria to earn a Satisfactory grade
Phase Assignments	For all assessed assignments, students must cumulatively earn 70% of all available points to earn a satisfactory grade. Points for each assignment and are available on Canvas.
Final Project Deliverables	In addition to earning a cumulative 70% or above for all course deliverables, students must earn 70% or above for the Final Project deliverables: <ul style="list-style-type: none"> ● Final Project Presentation ● Final Project Poster ● Final Project Report

Attendance	<p>The Data Science Project Course has limited instances where students are expected to attend in-person. The course will work with each team to schedule these sessions to minimize the chance that a student will be absent.</p> <p>Students are expected to attend all Phase Presentation/Discussion sessions in order to earn a satisfactory grade in the course. In the event a student is unable to attend their own presentation, they will be expected to attend and participate in an additional Phase Presentation/Discussion session to make up their missed session.</p> <ul style="list-style-type: none"> ● Students are expected to attend the entirety of the Phase Presentation/Discussion from start-to-finish, are expected to keep their camera on, and be situated in a professional/study space. If a student is found to be in violation of this policy, they may be subject to penalty in their Presentation/Discussion grade.
Professionalism	Depending on severity, students with lapses may not earn a Satisfactory grade.

Academic Integrity

The University of Illinois Urbana-Champaign Student Code should also be considered as a part of this syllabus. Students should pay particular attention to Article 1, Part 4: Academic Integrity. Read the Code at the following URL: <http://studentcode.illinois.edu/>.

Academic dishonesty may result in a failing grade. Every student is expected to review and abide by the Academic Integrity Policy: <https://studentcode.illinois.edu/article1/part4/1-401/>. Ignorance is not an excuse for any academic dishonesty. It is your responsibility to read this policy to avoid any misunderstanding. Do not hesitate to ask the instructor(s) if you are ever in doubt about what constitutes plagiarism, cheating, or any other breach of academic integrity.

Professionalism

In keeping with its educational goals, Carle Illinois expects students to display behavior, attitudes, and personal characteristics consistent with the standards expressed in this Statement on Professionalism, which is based on standards across the profession. Students who fail to comply with the Carle Illinois standards of professionalism are subject to action as approved by the Carle Illinois Student Progress and Promotions Committee ranging from completion of a program of remediation, participation in additional activities which could impact the students’ progress towards graduation, to suspension or dismissal depending on the severity of infringement. Behaviors deemed unprofessional by members of the Carle Illinois community that may not be specifically described in this policy will be reviewed by the Student Progress and Promotions Committee. Please refer to the Statement on Professionalism and the Dress Code Policy in the CIMED Student Handbook

Mistreatment

It is expected that Carle Illinois College of Medicine faculty, staff, students, and representatives will conduct themselves at all times in accordance with University conduct, policies, and guidelines - including the [Student Code](#) , [University Ethics](#), the Carle Behavior Standards, and [CI MED Professional Standards](#). The learning and work environments should be free of mistreatment, harassment, and threat of retaliation.

The Association of American Medical Colleges (AAMC) lists the following behaviors as mistreatment: public humiliation, requests to perform personal services, threatened or actual physical harm, sexual advances, denying teaching opportunities (or rewards), or receiving lower evaluations (or grades) based solely on gender, race or ethnicity, or sexual orientation; offensive remarks because of gender, race or ethnicity, or sexual orientation; or any other behaviors that disrespect the dignity of others and interferes with the learning environment.

Incidents of mistreatment should immediately be reported to the clerkship director or the assistant clerkship director. The CI MED mistreatment form (allowing for anonymous mistreatment reporting) is at <https://apply.medicine.illinois.edu/register/mistreatment>.

Safety

Please refer to the Preventing Bodily Fluid Exposure Policy and Contact Information List in the CIMED student handbook.

Please refer to the information regarding the [General Learning Environment and Mistreatment](#) in the CIMED student handbook. See the Run>Hide>Fight emergency preparedness document at the end of this syllabus.

Mental Health

Significant stress, mood changes, excessive worry, substance/alcohol misuse or interferences in eating or sleep can have an impact on academic performance, social development, and emotional wellbeing. The University of Illinois offers a variety of confidential services including individual and group counseling, crisis intervention, psychiatric services, and specialized screenings which are covered through the Student Health Fee. If you or someone you know experiences any of the above mental health concerns, it is strongly encouraged to contact or visit any of the University's resources provided below. Getting help is a smart and courageous thing to do for yourself and for those who care about you.

- Counseling Center (217) 333-3704
- McKinley Health Center (217) 333-2700
- National Suicide Prevention Lifeline (800) 273-8255
- Rosecrance Crisis Line (217) 359-4141 (available 24/7, 365 days a year)
- *If you are in immediate danger, call 911*

Community of Care

As members of the Illinois community, we each have a responsibility to express care and concern for one another. If you come across a classmate whose behavior concerns you, whether in regards to their well-being or yours, we encourage you to refer this behavior to the Student Assistance Center (217-333-0050 or <http://odos.illinois.edu/community-ofcare/referral/>). Based on your report, the staff in the Student Assistance Center reaches out to students to make sure they have support they need to be healthy and safe. Further, we understand the impact that struggles with mental health can have on your experience at Illinois. Significant stress, strained relationships, anxiety, excessive worry, alcohol/drug problems, a loss of motivation, or problems with eating and/or sleeping can all interfere with optimal academic performance. We encourage all students to reach out to talk with someone, and we want to make sure you are aware that you can access mental health support at the Counseling Center (<https://counselingcenter.illinois.edu/>) or McKinley Health Center (<https://mckinley.illinois.edu/>). For mental health emergencies, you can call 911 or walk-in the Counseling Center, no appointment needed.

Student with Disabilities

CIMED is committed to creating an inclusive learning environment for all students. To request disability-related academic adjustments and services for this course, students must contact Disability Resources and Educational Services (DRES). DRES provides disabled students with academic accommodations, support services, and resources. If you are already approved for accommodations, please share the letter of accommodation with the course/clerkship director so you can discuss using your accommodations in this course, if desired. To contact DRES, visit 1207 S. Oak St., Champaign, call 217.333.4603 (V/TDD), or e-mail disability@illinois.edu.

Family Educational Rights and Privacy Act (FERPA)

Any student who has suppressed their directory information pursuant to Family Educational Rights and Privacy Act (FERPA) should self-identify to the instructor to ensure protection of the privacy of their attendance in this course. See <http://registrar.illinois.edu/ferpa> for more information on FERPA

Religious Observances

The Religious Observance Accommodation Request form is available at <http://odos.illinois.edu/community-of-care/resources/docs/Religious-ObservanceAccommodation-Request-Form.pdf>. Submit the form to the instructor and to the Office of the Dean of Students (helpdean@illinois.edu) by the end of the second week of the course; in the case of exams or assignments scheduled after this period, students should submit the form to the instructor and to the Office of the Dean of Students as soon as possible.

Sexual Misconduct Reporting Obligation

The University of Illinois Urbana-Champaign prohibits sex discrimination in any education program or activity that it operates. Individuals may report concerns or questions to the Title IX Coordinator. The Title IX notice of nondiscrimination is located at go.uillinois.edu/StatementonSexDiscrimination. The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the University's Title IX and Disability Office. In turn, an individual with the Title IX and Disability Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options. A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here: wecare.illinois.edu/resources/students/#confidential. Other information about resources and reporting is available here: wecare.illinois.edu.

Statement in Support of Diversity

This statement's intent is to raise student and instructor awareness of the ongoing threat of bias and racism and of the need to take personal responsibility for creating an inclusive learning environment.

CIMED is committed to the creation of an anti-racist, inclusive community that welcomes diversity along a number of dimensions, including, but not limited to, race, ethnicity and national origins, gender and gender identity, sexuality, disability status, class, age, or religious beliefs. The College recognizes that we are learning together in the midst of the Black Lives Matter movement, that Black, Hispanic, and Indigenous voices and contributions have largely either been excluded from, or not recognized in, science and engineering, and that both overt racism and micro-aggressions threaten the well-being of

our students and our university community.

The effectiveness of this course is dependent upon each of us to create a safe and encouraging learning environment that allows for the open exchange of ideas while also ensuring equitable opportunities and respect for all of us. Everyone is expected to help establish and maintain an environment where students, staff, and faculty can contribute without fear of personal ridicule, or intolerant or offensive language. If you witness or experience racism, discrimination, micro-aggressions, or other offensive behavior, you are encouraged to bring this to the attention of the course director if you feel comfortable.

Disruptive Behavior

Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students' ability to learn and an instructor's ability to teach. A student responsible for disruptive behavior may be required to leave class pending discussion and resolution of the problem and may be reported to the Office for Student Conflict Resolution at <https://conflictresolution.illinois.edu>, conflictresolution@illinois.edu, or 333-3680 for disciplinary action.

Additionally, disruptive behavior may be reported through the Carle Illinois Professionalism Form at <https://apply.medicine.illinois.edu/register/professionalism>.

Emergency Response Recommendations

Emergency response recommendations and campus building floor plans can be found at the following website <https://police.illinois.edu/em/run-hide-fight/>. We encourage you to review this website within the first 10 days of class.

Additional information on emergency response at clinical locations will be discussed as part of orientation to the course.

Run > Hide > Fight

Emergencies can happen anywhere and at any time. It is important that we take a minute to prepare for a situation in which our safety or even our lives could depend on our ability to react quickly. When we're faced with almost any kind of emergency – like severe weather or if someone is trying to hurt you – we have three options: Run, hide or fight.



Run

Leaving the area quickly is the best option if it is safe to do so.

- ▶ Take time now to learn the different ways to leave your building.
- ▶ Leave personal items behind.
- ▶ Assist those who need help, but consider whether doing so puts yourself at risk.
- ▶ Alert authorities of the emergency when it is safe to do so.



Hide

When you can't or don't want to run, take shelter indoors.

- ▶ Take time now to learn different ways to seek shelter in your building.
- ▶ If severe weather is imminent, go to the nearest indoor storm refuge area.
- ▶ If someone is trying to hurt you and you can't evacuate, get to a place where you can't be seen, lock or barricade your area if possible, silence your phone, don't make any noise and don't come out until you receive an Illini-Alert indicating it is safe to do so.



Fight

As a last resort, you may need to fight to increase your chances of survival.

- ▶ Think about what kind of common items are in your area which you can use to defend yourself.
- ▶ Team up with others to fight if the situation allows.
- ▶ Mentally prepare yourself – you may be in a fight for your life.

of people with disabilities who may need additional assistance in emergency situations.

Other resources

- ▶ police.illinois.edu/safe for more information on how to prepare for emergencies, including how to run, hide or fight and building floor plans that can show you safe areas.
- ▶ emergency.illinois.edu to sign up for Illini-Alert text messages.
- ▶ Follow the **University of Illinois Police Department** on Twitter and Facebook to get regular updates about campus safety.

Governing Body: Curriculum Oversight Committee

(Note: The CCS was created on August 2, 2023. As approved by the COC, the CCS's charge includes approval of the syllabi for clinical courses and clerkships.)

Approval Date: XXXXX