

UNIVERSITY OF MICHIGAN
SCHOOL OF MEDICINE
DEPARTMENT OF LEARNING HEALTH SCIENCES

Learning Cycle Informatics LHS 678
Fall 2023

CREDIT HOURS: 3 credits

PRE-REQUISITES: None

CLASS SCHEDULE: Online

LOCATION: Online Canvas

FACULTY
Patricia A. Abbott, PhD, RN
Department of Learning Health Sciences
Email: pabbott@med.umich.edu

COURSE WEBSITE <https://umich.instructure.com/courses/612978>

COURSE DESCRIPTION This introductory course in informatics teaches students about informatics pertaining to the three main phases of the full 360-degree learning cycle for learning health systems. These phases are the performance-to-data (P2D) or data collection phase, the data-to-knowledge (D2K) or data aggregation and analysis phase, and the knowledge-to-practice (K2P) or intervention towards improvement phase.

COURSE OBJECTIVES

By completion of the course students will be able to:

- Appraise challenges currently faced by individuals seeking to establish Learning Health Systems (LHS) to improve health using information resources in each of the three connected Learning Cycle functions presented in the course (i.e., P2D, D2K, and K2P).
- Assess purposes and the requirements they drive to develop and deploy assistive and helpful information resources for people tasked with establishing and operating Learning Cycles for LHS.
- Examine how key methods in health informatics apply to developing new and better information resources, tools, and technical infrastructure for LHS.
- Explain, following hands-on exercises, the capabilities of a variety of current information resources, tools, and technical infrastructure components that can support work in the three Learning Cycle functions covered in the course.
- Assess the use of Electronic Health Records (EHRs) to complete tasks in support of LHSs, both functionally and operationally, using simulated patient data.
- Categorize the three key concepts of: infrastructure, interoperability, and standards as they interrelate to enable potentially improved information resources, tools, and infrastructure for establishing and operating Learning Cycles for LHS.
- Critique others' positions about health informatics topics with clear definitions of health informatics concepts.
- Report on the definitions of health informatics and Learning Cycle Informatics in detail to a variety of audiences.

CONTENT TOPICS

- What informatics is and isn't
- How science works
- The focus and activities of learning cycle informatics (LCI)
- Standards for health information
- Technical infrastructure
- Interoperability
- Electronic Health Records (EHRs) and Real-world Data (RWD)
- Use and management of computable knowledge.

TEACHING METHODS

This is an online course, which will be delivered via Canvas. **Canvas is an online** learning environment where you will interact with your classmates and the instructor. Within the course Canvas site, you will access the syllabus **and learning materials**, discuss issues, **find and** submit assignments, **communicate with** other students and the instructor, participate in small groups, and **share your work**.

This course will be taught using three main methods, which are (1) watching short videos and reading, (2) writing about the course content and how it applies to your personal interests about human health, and (3) doing introductory hands-on tasks using a variety of technical tools for gathering, collecting, querying, and analyzing health data, and for developing basic knowledge-based interventions. The hands-on aspects of the course will provide students a starting point to learn how to use tools like *R Studio* that may be used in other courses in the HILS program.

Please note that the syllabus is a progressive document which will be updated frequently throughout the semester. Please plan to check in at least weekly to review any changes in upcoming work.

GRADING AND EVALUATION

Grading will be based on four things adding up to 100 points. The graded items are:

1. **Four short written papers**, 5 points each (20% of final grade)
2. **Ten data collection assignments**, 3 points each (30% of final grade)
3. **Four 'Huddle and Share' Group Assignments**, 10 points each (40% of final grade)
4. **Four 'Huddle and Share' Discussion Posts**, 2.5 points each (10% of final grade)

GRADING POLICIES

Late assignments:

Late Short Written Papers: Unless illness or other extenuating circumstances apply, late short written papers will receive a score no higher than 4 points and a grade no higher than a B (3.0) so long as they are received within one week after the due date. Papers received after this one-week grace period will receive a score of 1 point only and only if a reasonable submission is submitted.

Late Data Collection Assignments: Unless illness or other extenuating circumstances apply, late data collection assignments will receive a score no higher than 2.5 points and a grade no higher than a B (3.0) so long as they are received within one week after the due date. These assignments will not be accepted after this one-week grace period ends.

Late Huddle and Share Group Assignments: Because these assignments are needed by the whole class, no late huddle and share group assignments can be accepted. Groups are advised to turn in what they have completed by the due date in all cases.

Late Huddle and Share Group Individual Discussion Posts: Unless illness or other extenuating circumstances apply, late individual discussion posts will receive a score no higher than 2 points and a grade no higher than a B (3.0) so long as they are posted within one week after the due date. Posts received after this one-week grace period will receive a score of 1 point only.

Whenever possible, discuss any anticipated problems turning in assignments on time with the instructor before assignments are due.

No do-over policy

For a variety of reasons, it is not possible to allow students to re-do assignments in the course.

Getting assignments back with feedback and grades

Graded assignments will be returned to students in Canvas, often with comments and feedback from the instructor. The instructor will strive to get assignments back to students within 7 days of receiving them, if not sooner.

Calculating final course grades

Final grades are determined by a weighted average of your four graded assignments using a 4.0 "letter-grade" scale (A=4.0).

Numeric or categorical scores for assignments or elements are first converted to letter grades for each assignment, using the Rackham Graduate School's grade scale below, and only then averaged. Averages are only ever rounded up and never down (see below).

A+ = 4.3, A = 4.0, A- = 3.7

B+ = 3.3, B = 3.0, B- = 2.7

C+ = 2.3, C = 2.0, C- = 1.7

Here is an example of a final grade calculation for this course:

1. Four short written papers --> A = 4.0 for 20% of the final course grade
2. Ten Data Collection Assignments --> B = 3.0 for 30% of the final course grade
3. Huddle and Share Group Assignments --> A = 4.0 for 40% of the final course grade
4. Individual Huddle and Share Discussion Posts --> B+ = 3.3 for 10% of the final grade Final Numeric Grade =

$$(0.2 \times 4.0) + (0.3 \times 3.0) + (0.4 \times 4.0) + (0.1 \times 3.3) = 3.63$$

Final Letter Grade for a score of 3.63 = B+

By rounding up, final grades fit into these numeric ranges:

A+ = 4.01 to 4.30, A = 3.86 to 4.00, A- = 3.66 to 3.85 B+

= 3.26 to 3.65, B = 2.86 to 3.25, B- = 2.66 to 2.85

C+ = 2.26 to 2.65, C = 1.86 to 2.25, C- = 1.66 to 1.85

No Curve

No "curve" is used when calculating grades. Grades are independently calculated for every student and are NOT calculated relative to the performance of others in the course. This means that there is no intended grade distribution and all students' grades in the course are independent of other students' grades.

Please note that unless otherwise noted and agreed on, all assignments are individual, and students are expected to work independently of each other. Please review University and School statements regarding violations of honor codes, plagiarism and other academic improprieties.

DLHS Grade Grievance Policy

Regular feedback on graded assignments and timely resolution of any grading concerns is helpful for student learning and overall positive experience. Students are encouraged to discuss any assignment grade concerns with the instructor(s) within two weeks of the grades being posted on Canvas. Similarly, any concerns and grievances related to the overall course grades should be raised by contacting the faculty of record within two weeks of the course grades being posted on Wolverine Access.

For this course, the grade dispute arbitration will happen within the Department of Learning Health Sciences (DLHS). After initial discussion with the faculty of record for the course, there is an opportunity for a second look by another DLHS faculty member with appropriate expertise for resolving grade disputes. If the student and faculty are not able to come to an agreement about the grade dispute, the Associate Chair for Educational Programs or assigned designee will adjudicate the dispute. Per Rackham's Academic Dispute Resolution Process, if the concern is not resolved, the student may seek a formal resolution conference with the Medical School's Rackham Resolution Officer (see <https://rackham.umich.edu/academic-policies/section9/> for full policy and the contact information for the current resolution officer).

REQUIRED TEXTS AND OTHER MATERIALS

Book

Strevens, M. (2020). *The knowledge machine: How irrationality created modern science*. Liveright Publishing Corporation.

Additional readings:

This course will utilize assigned readings including journal articles and book chapters, as well as government publications. All resources are available through the University of Michigan Library or through direct link to the resource.

COURSE POLICIES

Accessibility and Accommodations

The instructor is committed to helping all students succeed in the course. Regarding any personal concerns or special needs, students should speak with the instructor before or during the first week of classes. Also, students seeking academic accommodations should register with Services for Students with Disabilities (SSD). SSD arranges reasonable and appropriate academic accommodations for students with disabilities.

Please visit <https://ssd.umich.edu> for more information.

COVID-19 Statement

We each have a responsibility for protecting the collective health of our community. Applicable safety measures are described on the U-M Health Response website - <https://healthresponse.umich.edu/> Please bookmark this site for policies, guidance, and FAQs.

Attendance

Students are expected to make up any work that is missed.

Expectations

The assigned weekly videos and readings will prepare students to do the individual and small group writing assignments that are core to the course. The main focus is the emerging informatics domain of Learning Cycle Informatics (LCI). Students will be challenged to think about how information is used throughout the scientific, technical, clinical, behavioral, and social activities that take place in learning communities as they work to complete learning cycles and improve. Students will apply concepts from the course to one or more health topics or areas

that are of particular interest to them. The course moves swiftly through its content. For this reason, it is necessary to study consistently each week so as not to fall behind.

Digital Etiquette

Students should turn off ring-tones and other audible alerts on their phones/tablets/laptops before attending any elective class sessions, whether in-person or online. The use of phones/tablets/laptops for non-course related activities, such as texting, emailing, and social media is distracting to your classmates and instructors. If there is an emergency, please excuse yourself from the classroom and/or the Zoom meeting to attend to it.

It is a good idea to give our name when beginning to speak for the first time in a Zoom meeting. In group settings on Zoom, try to use the mute microphone setting when not actively speaking to improve overall audio and caption quality for all attendees.

REMOTE LEARNING

Remote Learning– Zoom

Although this is an online course without synchronous course sessions, there may be times when real-time discussion or small group meetings for assignments or group work are needed. The instructor will also hold private office hours on request and host an elective weekly drop-in Q&A session in real time as well.

The course will use Zoom for these elective synchronous (“real time”) weekly drop-in meetings. Drop-in meeting days and times are listed at the top of this Syllabus and will be communicated by the instructor in multiple ways.

Please take the time to familiarize yourself with Zoom by visiting [U-M’s Getting Started with Zoom](#) page. You may choose to use Zoom on your mobile device (phone or tablet).

This article describes how to update your name in Zoom:

<https://teamdynamix.umich.edu/TDClient/30/Portal/KB/ArticleDet?ID=746>

Some students and faculty may also wish to add their personal pronouns beside their names.

Things to Know About Zoom:

- You must sign into a Zoom session using your uniquename and password (for med.umich.edu users: enter your Level 1 credentials).
- You can contact [Information and Technology Services](#) if you have any technical issues accessing Zoom. You can also contact [Health Information Technology & Services](#) for help.

INSTITUTIONAL POLICIES

Academic Integrity of Students

The academic community, like all communities, functions best when its members treat one another with honesty, fairness, respect, and trust. Your instructors expect students to work and study together to foster learning and understanding of the material. However, direct copying of homework, copying of homework from existing solutions, cheating on an exam, and other conduct that violates the academic integrity and ethical standards of the Rackham Graduate School community cannot be tolerated and will result in serious consequences and disciplinary action.

All written submissions must be your own, original work. Original work for narrative questions is not mere paraphrasing of someone else's completed answer: you must not share written answers with each other at all. At

most, you should be working from notes you took while participating in a study session. Largely duplicate copies of the same assignment will receive an equal division of the total point score from the one piece of work.

You may incorporate selected excerpts, statements, or phrases from publications by other authors, but they must be clearly marked as quotations and must be attributed. If you build on the ideas of prior authors, you must cite their work. You may obtain copy editing assistance, and you may discuss your ideas with others, but all substantive writing and ideas must be your own or be explicitly attributed to another.

If we suspect you have cheated (including plagiarism), at the very least you will receive a zero on the assignment. Rackham policy dictates that we must report every instance of academic dishonesty, no matter how small. Suspected academic misconduct will be handled by Drs. Piatt and Donnelly. <https://rackham.umich.edu/academic-policies/section8/>

Student Academic Dispute Procedures

Rackham's Academic Dispute Resolution Policy and Procedures are available to Rackham students who have a dispute or disagreement with faculty or staff about the equity and fairness of decisions or procedures that affect their academic standing, the conduct of their research, and progress toward the degree. Such issues may arise regarding fair and equal treatment in the conduct of a class, in the pursuit of the student's research, and in the grading or evaluation of academic work and research. Other issues may concern the equity and fairness of program, department, or Rackham policies. <https://rackham.umich.edu/academic-policies/section9/>

Diversity, Equity, and Inclusion

The Department of Learning Health Sciences (DLHS) is committed to developing the institutional mechanisms and norms necessary to promote the values of diversity, equity, and inclusion, both inside and outside our classrooms. To this end, DLHS upholds the expectations that all courses will: (1) be inclusive, (2) promote honest & respectful discussions, (3) follow multicultural ground rules and (4) abide by UM policies and procedures. Inclusive courses are those in which teachers and learners co-create and co-sustain environments that support and encourage all members to participate equitably. <https://rackham.umich.edu/rackham-life/diversity-equity-and-inclusion/>

Accessibility and Accommodations

Students should speak with their instructors before or during the first week of classes regarding any special needs. Students seeking academic accommodations should register with Services for Students with Disabilities (SSD). SSD arranges reasonable and appropriate academic accommodations for students with disabilities. Please visit <https://ssd.umich.edu/accommodations> for more information on student accommodations.

Student Parents and Caregivers

If you are a pregnant, parenting student, or primarily responsible for providing care for a loved one or family member, and you need any accommodations, please let the instructor know at your earliest convenience. You may also reach out to mcasp.org and CEW+ for resources and community support.

Student Mental Health and Well-Being

The University of Michigan is committed to advancing the mental health and wellbeing of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, contact Counseling and Psychological Services (CAPS) at (734) 764-8312 and <https://caps.umich.edu/> during and after hours, on weekends and holidays, or through its counselors physically located in schools on both North and Central Campus. You may also consult University Health Service (UHS) at (734) 764-8320 and <https://www.uhs.umich.edu/mentalhealthsvcs>, or for alcohol or drug concerns, see www.uhs.umich.edu/aodresources.

For a listing of other mental health resources available on and off campus, visit: <https://caps.umich.edu/article/finding-your-community-provider-database-included> .

Sexual Misconduct/Sexual Harassment Reporting

Title IX prohibits sex discrimination to include sexual misconduct: harassment, domestic and dating violence, sexual assault, and stalking. If you or someone you know has been harassed or assaulted, you can receive confidential support and academic advocacy at the Sexual Assault Prevention and Awareness Center (SAPAC). SAPAC can be contacted on their 24-hour crisis line, 734-936-3333 and online at sapac.umich.edu. Alleged violations can be reported non-confidentially to the Office for Institutional Equity (OIE) at institutional.equity@umich.edu. Reports to law enforcement can be made to University of Michigan Police Department at 734-763-3434.

Support for Food Insecurity

Students across the country experience food insecurity at alarming rates. The Maize and Blue Cupboard at the University of Michigan provides food, kitchen and cooking supplies, personal and household items, and support services. For information about accessing their services, please visit <https://mbc.studentlife.umich.edu/>

Confidentiality and Mandatory Reporting

As instructors, one of our responsibilities is to help create a safe learning environment on our campus. Dr. Piatt also has a mandatory reporting responsibility related to her role as the Director of the Health Infrastructures and Learning Systems degree program. Instructors are required to share information regarding sexual misconduct or information about a crime that may have occurred on U-M's campus with the University. Students may speak to someone confidentially by contacting SAPAC's Crisis Line at (734) 936-3333.

MAIN COURSE ACTIVITIES

Reading and Watching Course Content: Every week, a set of coordinated short videos, chapter and paper readings are used to convey the core instructional content of the course.

Huddle and Share: These are four small group activities that each span a few weekly modules. Depending on course size, for each Huddle and Share assignment, you will begin by joining a new small group of student peers to work with to answer a series of questions. This way, by the end of the term, you will have met most of the students in the course. Each small group will provide their written submission for a group grade. Then, each student in the class will individually post a discussion comment after having reviewed the work of one or more of the other groups. Group size and assignment will depend on the number of students enrolled.

Short Written Papers: There are four papers that will be completed in the course. Each will focus on a key topic related to Learning Cycle Informatics.

Data Collection Assignments: You will complete data collection assignments using external web-based tools to provide multiple opportunities to gain hands-on experience with key industry tools.

ASSIGNMENTS, DUE DATES, AND DIRECTIONS

Each week, you will work with your group on the assigned Huddle and Share assignments and any assigned written assignments or data collection assignments. Please refer to the guidelines /directions and grading rubrics provided on Canvas.

Assignment Due Dates

Assignment	DUE DATE	% overall grade
Huddle and Share 1-Group Submission	Module 3, Wednesday 11:59 pm ET	10%
Huddle and Share 2-Group Submission	Module 7, Wednesday 11:59 pm ET	10%
Huddle and Share 3-Group Submission	Module 10, Wednesday 11:59 pm ET	10%
Huddle and Share 4-Group Submission	Module 13, Wednesday 11:59 pm ET	10%
Your Personal View of Mass Produced Science Paper Assignment	End of Module 1, Sunday 11:59 pm ET	5%
Health Problem Paper Assignment	End of Module 5, Sunday 11:59 pm ET	5%
Data Landscape Paper Assignment	End of Module 9 Sunday 11:59 pm ET	5%
Computable Biomedical Knowledge Paper Assignment	End of Module 12.5, Sunday 11:59 pm ET (Thanksgiving Break)	5%
Data Collection Assignments	End of : Module 2, Sunday 11:59 pm ET Module 3, Sunday 11:59 pm ET Module 4, Sunday 11:59 pm ET Module 6, Sunday 11:59 pm ET Module 7, Sunday 11:59 pm ET Module 8, Sunday 11:59 pm ET Module 10, Sunday 11:59 pm ET Module 11, Sunday 11:59 pm ET Module 12, Sunday 11:59 pm ET Module 13, Sunday 11:59 pm ET	3% 3% 3% 3% 3% 3% 3% 3% 3% 3% 3%
Huddle and Share - Individual Participation	End of : Module 3, Sunday 11:59 pm ET Module 7, Sunday 11:59 pm ET Module 10, Sunday 11:59 pm ET Module 13, Sunday 11:59 pm ET	2.5% 2.5% 2.5%
TOTAL		100%

READINGS (completed by)

Week	Start Date	Readings
1	August 28	Strevens, Chapter 1 Friedman, 2009 McGinnis et al., 2021
2	Sept 3	Strevens, Chapter 2 Friedman, 2013
3	Sept 10	Strevens, Chapter 3 Richesson et al. 2014
4	Sept 17	Strevens, Chapter 4 Braunstein, 2014
5	Sept 24	Strevens, Chapter 5 Friedman et al., 2017
6	Oct 1	Strevens, Chapter 6 Green et al, 2020
7	Oct 8	Strevens, Chapter 7 Breiman, 2001
8	Oct 15	Strevens, Chapter 8 Hripcsak et al., 2015
9	Oct 22	Strevens, Chapter 9 Forrest et al., 2014
10	Oct 29	Strevens, Chapter 10 Topol, 2019
11	Nov 5	Strevens, Chapter 11 Rozenblum et al., 2019
12	Nov 12	Strevens, Chapter 12 Lavi & Leidner, 2001
<i>No Class</i>	<i>HAPPY</i>	<i>THANKSGIVING</i>
13	Nov 26	Strevens, Chapter 13 Boxwala et al., 2011
14	Dec 3	Strevens, Chapter 14 Wong & Peek, 2020