COURSE INFORMATION
COMP-4112 Introduction to Data Science
Fall 2024, Orillia

Calendar Description:
An introduction to the main tools and ideas in the data scientist's toolbox. An overview of the data, questions, and tools that data analysts and data scientists work with. There are two components to this course. The first is a conceptual introduction to the ideas behind turning unstructured data into actionable knowledge. The second is a practical introduction to the tools that are commonly used in Data Science such as R and Python.

Instructor Information:

Instructor: Dr. Chris Brogly
Office Location: OA, 3rd floor, #13
E-mail: cbrogly@lakeheadu.ca
Office Hours: Location and hours to be posted on myCourseInfo

TA(s): see myCourseInfo

Course Identification:

Course Delivery: Lectures, MyCourseLink/D2L
Room and Time: OA-1022, 4:00-5:20PM MW
Final Date to Withdraw (Drop): November 8, 2024
Final Day of Classes: December 3, 2024
Fall Study Week: October 14, 2024 - October 18, 2024

Prerequisite(s):
Computer Science 2477, Mathematics 2310

Evaluation

Final grades are calculated based on the following evaluation:

- 3-4 Assignments, 20%
- Midterm, 30%, TBA, in class

    - Format: Mixed
- Project, 40%
    - Project Report & Deliverables Evaluation: 40%
    - Due: Nov 22
    - The instructor will provide suitable options for data science projects; students may also select and pursue their own topic with instructor approval. Students will design, prototype, and, ideally, implement a software solution that addresses some aspect of data science. The scope of the project will be limited to be suitable for a one-term course. The instructor will assess the overall quality of deliverables based on the selected topic and a assign a grade. Students may work individually or in groups no larger than 3. Team size may be considered as part of the instructor's assessment. No peer evaluation will be completed; one mark will be assigned to all members.
- Short Presentation or Presentation Assignment, 10%
    - The instructor will assign research papers in data science for students to summarize and present. Presentations may be done live in-class, or as powerpoints to be submitted, at the instructor's discretion. This should not exceed 10-12 minutes.
    - If the instructor opts for the in-class presentation option, they will occur on part of November 18 and on November 20. Otherwise, recorded powerpoints will be submitted by November 20 via myCourseLink.

Course Text and Online Resources:

- An Introduction to Statistical Learning with Applications in Python, by Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, Jonathan Taylor.
- Research Articles and instructor provided documents will be posted on MyCourseLink. Recommended readings per week will be posted by the instructor on MyCourseLink.

Weeks	Topics to cover
Week 1	Course syllabus, Introduction to Data Science Data, information
Week 2	Data Preparation & Transformation, Statistics, Correlations (Content on myCourseInfo)
Week 3	Statistical Learning, Classification (Book: Chapter 2, Chapter 4)

Week 4	Statistical Learning, Classification (Book: Chapter 2, Chapter 4)
Week 5	Statistical Learning, Regression (Book: Chapter 3)
Week 6	Break (Fall Reading Week)
Week 7	Visualization/Statistics (Content provided on myCourseInfo)
Week 8	Resampling Methods, Model Selection (Book: Chapter 5, Chapter 6)
Week 9	Tree-Based Methods, SVMs, Unsupervised Learning (Chapter 8, Chapter 9, Chapter 12)
Week 10	Unsupervised learning, Neural Networks (Chapter 12, Chapter 10)
Week 11	Neural Networks or Selected topics (Chapter 10)
Week 12	Selected topics

Assignments and Evaluations:

Students taking this course must understand and agree that:

(1) Unless otherwise allowed by the course instructor, students must complete the assignments in this course without the assistance of anyone else.

(2) Unless otherwise allowed by the course instructor, students must not access any sources or materials (in print, online, or in any other way) to complete any course exam.

Academic Integrity:

Students must further understand and agree that, if they violate either of these two rules, or if they provide any false or misleading information about their completion of course assignments or exams, they may be prosecuted under the Lakehead University Student Code of Conduct – Academic Integrity, which requires students to act ethically and with integrity in academic matters and to demonstrate behaviors that support the University's academic values.

Assignments: There is **Zero-Tolerance** for plagiarism cases. All such cases will be dealt with according to University prescribed rules. All assignments are individual. Students should understand that their assignments must go through a similarity check and if there is similarity detected then **ZERO** mark will be awarded to those students involved in copying.

Late Assignments: Late assignments will automatically receive a **ZERO** however they will be reviewed to provide formative evaluation feedback and must be submitted for course Completion.

Use of AI tools: Please see Lakehead's Policy on AI usage https://www.lakeheadu.ca/students/student-life/student-conduct/academic-integrity/chatgpt-ai-tools

Course Policies:

- Behavioral standards to follow: Student Code of Conduct - Academic Integrity
- Attendance and participation in class discussions is highly recommended.
- Students can communicate with the instructor through email.
- The course outline and schedule are not fixed and subject to change based on class flow.
- University's attendance policy is followed.
- There will be 4 assignments. There are late penalties for assignments determined by the course instructor. Extensions will be granted only by the course instructor. If you have medical or compassionate grounds for an extension, you should take supporting documentation to the office of the Dean of your faculty, who will contact the instructor.
- Assignments and time will be posted on MyCourseLink/D2L and announced via emails to all registered students.

Copyright:

Students should be aware that all instructional, reference, and administrative materials prepared for this course are protected in their entirety by copyright. Students are expected to comply with this copyright by only accessing and using the course materials for personal educational use related to the course, and that the materials cannot be shared in any way, without the written authorization of the course instructor. If this copyright is infringed in any way, students may be prosecuted under the Lakehead University Student Code of Conduct – Academic Integrity, which requires students to act ethically and with integrity in academic matters and to demonstrate behaviors that support the University's academic values.

Regulations:

It is the responsibility of each student registered at Lakehead University to be familiar with, and comply with all the terms, requirements, regulations, policies and conditions in the Lakehead University Academic Calendar. This includes, but is not limited to, Academic Program Requirements, Academic Schedule of Dates, University and Faculty/School Policies and Regulations and the Fees and Refund Policies and Schedules (Lakehead University Regulations webpage, 2023-24).

Academic Integrity:

A breach of Academic Integrity is a serious offense. The principle of Academic Integrity, particularly of doing one's own work, documenting properly (including use of quotation marks, appropriate paraphrasing and referencing/citation), collaborating appropriately, and avoiding misrepresentation, is a core principle in university study. Students should view the Student Code of Conduct - Academic Integrity for a full description of academic offenses, procedures when Academic Integrity breaches are suspected and sanctions for breaches of Academic Integrity.

Support for Students:
There are many resources available to support students. These include but are not limited to:

- Health and Wellness
- Student Success Centre
- Student Accessibility Centre
- Library
- Lakehead International
- Indigenous Initiatives

Lakehead University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities and/or medical conditions to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability and think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as early as possible. For more information, please contact Student Accessibility Services (SC0003, 343-8047 or sas@lakeheadu.ca