

**COMP 5012**

Big Data

**Fall 2023**

**Department of Computer Science**

**Lakehead University**

**Course Schedule: Lecture**

**Instructor Information:**

Instructor: Dr. Abedalrhman Alkhateeb

Email: aalkhate@lakeheadu.ca

**Course Description:**

The explosion of social media and the computerization resulted in large volume of mostly unstructured data: web logs, videos, speech recordings, photographs, and e-mails. The key objective is for the students to learn and understand the most important technologies used in manipulating, storing, and analyzing Big Data. Many data analytics techniques will be introduced such as classification and clustering, decision trees, linear and logistic regression, time series analysis, and text analytics. Students will also learn how to select and apply the correct Big Data stores for disparate data sets and how to use proper data analytics techniques. Students will develop a variety of Big Data applications in their assignments and project practices.

**Textbook**: 1. Lekovec, Rajaraman & Ullman, Mining of Massive Datasets, 3rd edition

2. Max Bramer, Principles of Data Mining

Students do not need to buy any textbooks. All related materials will be provided by the instructor.

**Additional Resource**: Various research papers will be assigned by the instructor.

**Learning Outcome:**

By the end of this course, students will be able to:

* Acquired and preprocess the required data for big data analysis.
* Understand MapReduce paradigm.
* Learn the cutting edge tools and platforms in big data.
* Recognize and detects problems need to be solved using big data tools and platform.
* Research a topic/area in big data.
* Understand how to use big data concept to facilitate machine learning tasks.
* Present the gained knowledge in big data through out the course presentation.
* Apply big data concepts on real life problems.
* Work and lead a team by spreading the big data module tasks through out the project.
* Advance technical writing in the area of big data.

**Tentative Course Outline/Schedule:**

The following course schedule is tentative and will be adjusted as needed to keep the course flexible and cover the most material.

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| **Tentative Topics** |
| Introduction to Big Data |
| Big Data Platforms |
| Introduction to Hadoop |
| MapReduce |
| HDFS |
| Modules of Big Data |
| Applications of Big Data |
| Presentations |
| Projects |

**Course Evaluation:**

|  |  |
| --- | --- |
| Paper Presentation | **20** |
| Mid Term exam | **40** |
| Project (Presentation – 10%, report 10% and Implementation 20%) | **40** |
|  | **100** |

**Attendance:**

Regular attendance at lectures as well as active participation in classroom discussions is an important factor for student success. The successful student must develop good note-taking skills and be willing to ask questions. There will be no grade for attendance of lectures.

**Late Policy:**

Students missing tests will only be permitted to make up for the missed evaluation with proper documentation for illness or bereavement; otherwise, a grade of zero will be applied. No late assignments will be accepted without prior approval.

**Course Policies**

● [Student Code of Conduct - Academic Integrity](https://www.lakeheadu.ca/students/student-life/student-conduct/academic-integrity/node/51239)

The following integrity statement will be used in each submission (assignments and take-home tests)

**Academic Integrity Statement:**

I understand and agree that:

1. I must complete the individual assessments in this course without the assistance of anyone else.

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

I further understand and agree that, if I violate either of these two rules, or if I provide any false or misleading information about my completion of course assignments or exams, I 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 behaviours that support the University’s academic values.

**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 anyway, 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.

**Copyright Compliance:**

I understand and agree that all instructional, reference, and administrative materials to which I am given access in this course (the "course materials"), whether they consist of text, still or kinetic images, or sound, whether they are in digital or hard copy formats, and in whatever media they are offered, are protected in their entirety by copyright, and that to comply with this copyright and the law

1. I may access and download the course materials only for my own personal and non-commercial use for this course; and

1. I am not permitted to download, copy, or store (in any medium) any text, image, or sound component of the course materials for any other purpose whatsoever, or to forward or share, transmit, broadcast, show, post or play in public, adapt, or change in any way any text, image, or sound component of the course materials, except as expressly authorized, and only to the extent authorized, in writing, by the course instructor."

I further understand and agree that, if I infringe the copyright of the course materials in any way, I 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 behaviours 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.](http://navigator.lakeheadu.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=25&chapterid=6999&loaduseredits=False) 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 offence. 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](https://www.lakeheadu.ca/students/student-life/student-conduct/academic-integrity/node/51239) for a full description of academic offences, procedures when Academic Integrity breaches are suspected and sanctions for breaches of Academic Integrity.

**Supports for Students** – there are many resources available to support students. These include but are not limited to:

* [Health and Wellness](https://www.lakeheadu.ca/students/wellness-recreation/student-health-and-wellness)
* [Student Success Centre](https://www.lakeheadu.ca/current-students/student-success-centre)
* [Student Accessibility Centre](https://www.lakeheadu.ca/current-students/student-services/accessibility/)
* [Library](https://library.lakeheadu.ca/)
* [Lakehead International](https://www.lakeheadu.ca/international)
* [Indigenous Initiatives](https://www.lakeheadu.ca/indigenous)

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](http://studentaccessibility.lakeheadu.ca/)  (SC0003, 3438047 or sas@lakeheadu.ca)