

Faculty of Science

CSCI 4030U: Big Data Analytics

Course outline for Winter 2019

**1. Course Details & Important Dates\***

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| --- | --- | --- | --- |
| Term | Course Type | Day | Time |
| Winter 2019 | Undergraduate | Wednesdays | 2:10am – 5:00pm |
|  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Location | CRN # | Classes Start | Classes End | Final Exam Period |
| ERC1096 | 73821 | Jan. 7th, 2019 | Apr. 5th, 2019 | Apr. 8 – 20, 2019 |

\* for other important dates go to: [www.uoit.ca](http://www.uoit.ca) >Current Students >Important Dates and Deadlines

**2. Instructor Contact Information**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Instructor Name | Office | Phone | Email | |
| Jaroslaw Szlichta | UA 4020 | 905-721-8668 x 5305 | jaroslaw.szlichta@uoit.ca |
| Office Hours: Wednesdays, 5pm – 6pm, UA 4020 | | | |

|  |  |
| --- | --- |
| Laboratory/Teaching Assistant Name | Email |
| Alexandar Mihaylov  Bahare Askari | alexandar.mihaylov@uoit.net  askari.b74@gmail.com |

**3. Course Description**

This course covers advanced topics in data process and analytics with special emphasis on Big Data.  Topics of the course will include, but are not limited to, indexing structures for fast information retrieval, query processing algorithms, distributed storage and processing, scalable machine learning and statistical techniques, and trends of modern very large scale data systems.  Students will gain understanding on the theoretical foundation and practical design principles of modern Big Data processing systems.

**4. Learning Outcomes**

1. Understand the unique challenges of processing Big Data at the theoretical and practical level.
2. Understand time proven and state of the art algorithms and practices of Big Data processing.
3. Learn how a big data system is built. Students will learn the issues involved in designing efficient big data systems, and the strategies, data-structures, and algorithms used in the implementation of such systems.
4. Able to utilize existing machine learning and statistical methods to intelligently process Big Data to support a wide range of queries including: search, summarization, business intelligence and data mining.
5. Introduce students to data warehousing concepts and OLAP reporting.
6. Apply existing state-of-art algorithms for Big Data based on the topics covered in this course.

**5. Course Design**

Lectures in this course will include both presented material, and interactive elements. The classroom interaction will be designed to solidify concepts and techniques learned in the lectures. Examples for this course could be documents, diagrams, etc.

In order to achieve success in this course, students must attend all lectures. Regular absences mean that you miss critical information and just are not able to catch up. The instructor will provide the majority of classroom materials on the Blackboard site. Seeing the slides and examples is not the same experience as being present while we work through it, and I explain the decisions we have made. The TAs will supervise the laboratories, while you complete an assignment designed by the instructor. The instructor and the TAs will collaborate on the marking of course components (e.g. tests, labs and projects).

**6. Outline of Topics in the Course**

1. Data Mining
2. Finding Similar Items
3. Mining Data Streams
4. Link Analysis
5. Frequent Itemsets
6. Clustering
7. Advertising on the Web
8. Recommendation Systems
9. Mining Social-Network Graphs
10. Dimensionality Reduction
11. Large-Scale Machine Learning

**7. Required Texts/Readings**

Mining of Massive Datasets, Jure Leskovec, Anand Rajaraman, Jeff Ullman

See Blackboard

**8. Evaluation Method**

|  |  |
| --- | --- |
| **Component** | **Weight** |
| Labs | 10% |
| Project | 20% |
| Midterm I | 20% |
| Participation and Presentation | 10% |
| Final Midterm | 40% |

*Further information on grading can be found in Section 5 of the UOIT Academic Calendar.*

**9. Assignments and Tests**

|  |  |  |
| --- | --- | --- |
| **Component** | **Due Date** | **Weight** |
| Labs | Every week (10 labs) | 10% |
| Midterm | TBD, February 2018 | 20% |
| Project | TBD, February, and April 2018 | 20% |
| Participation/Presentation | TBD | 5% |
| Final Midterm | TBD, April 2018 | 40% |

Any student who misses an examination without a valid medical reason and documentation will receive zero for that examination. Those who submit medical documentation, or otherwise notify the instructor, within 24 hours will either be given a makeup exam or will have the weight of the examination added to the final exam.

**10. Students with Disabilities**

Accommodating students with disabilities at UOIT is a responsibility shared among various partners: the students themselves, SAS staff and faculty members. To ensure that disability-related concerns are properly addressed during this course, students with documented disabilities and who may require assistance to participate in this class are encouraged to speak with me as soon as possible. **Students who suspect they have a disability that may affect their participation in this course are advised to go to Student Accessibility Services (SAS) as soon as possible.** Maintaining communication and working collaboratively with SAS and faculty members will ensure you have the greatest chance of academic success.

* Students taking courses on the North Campus Location can visit Student Accessibility Services in the U5 Building located in the Student Life Suite
* Students taking courses on the Downtown Oshawa Campus Location can visit Student Accessibility Services in the 61 Charles St. Building, 2nd Floor, Room DTA 225 in the Student Life Suite.

Disability-related support and accommodation support is available for students with mental health, physical, mobility, sensory, medical, cognitive, or learning challenges.  Office hours are 8:30am-4:30pm, Mon-Fri.  For more information on services provided, you can visit the SAS website at <http://uoit.ca/studentaccessibility>

Students may contact Student Accessibility Services by calling 905-721-3266, or email [studentaccessibility@uoit.ca](mailto:studentaccessibility@uoit.ca)

Students who require the use of the Test Centre to write tests, midterms, or quizzes MUST register online using the SAS test/exam sign-up module, found here [www.uoit.ca/SASexams](http://www.uoit.ca/SASexams). Students must sign up for tests, midterms or quizzes AT LEAST seven (7) days before the date of the test.

Students must register for final exams by the registration deadline, which is typically 2 weeks prior to the start of the final examination period. SAS will notify students of the registration deadline date.

**11. Academic Integrity**

Students and faculty at UOIT share an important responsibility to maintain the integrity of the teaching and learning relationship. This relationship is characterized by honesty, fairness and mutual respect for the aim and principles of the pursuit of education. Academic misconduct impedes the activities of the university community and is punishable by appropriate disciplinary action.

Students are expected to be familiar with and abide by UOIT’s regulations on Academic Conduct (Section 5.15 of the Academic Calendar) which sets out the kinds of actions that constitute academic misconduct, including plagiarism, copying or allowing one’s own work to copied, use of unauthorized aids in examinations and tests, submitting work prepared in collaboration with another student when such collaboration has not been authorized, among other academic offences. The regulations also describe the procedures for dealing with allegations, and the sanctions for any finding of academic misconduct, which can range from a resubmission of work to a failing grade to permanent expulsion from the university. A lack of familiarity with UOIT’s regulations on academic conduct does not constitute a defense against its application.

Further information about academic misconduct can be found in the Academic Integrity link on your laptop. Extra support services are available to all UOIT students in academic development, study skills, counseling, and peer mentorship. More information on student support services can be found in the Academic Calendar (Section 8).

*Copying of assignments or lab assignments, and cheating on tests or the final exam will not be tolerated in this course. Violators will face a minimum of a zero mark for that course component, and likely further disciplinary action through the academic integrity council.*

**12. Turnitin**

UOIT and faculty members reserve the right to use electronic means to detect and help prevent plagiarism. Students agree that by taking this course all assignments are subject to submission for textual similarity review by Turnitin.com. Assignments submitted to Turnitin.com will be included as source documents in Turnitin.com's restricted access database solely for the purpose of detecting plagiarism in such documents for five academic years. The instructor may require students to submit their assignments electronically to Turnitin.com or the instructor may submit questionable text on behalf of a student. The terms that apply to UOIT's use of the Turnitin.com service are described on the Turnitin.com website.

Students who do not wish to have their work submitted to Turnitin.com must provide with their assignment at the time of submission to the instructor a signed Turnitin.com Assignment Cover sheet:

<http://www.uoit.ca/assets/Academic~Integrity~Site/Forms/Assignment%20Cover%20sheet.pdf>

Further information about Turnitin can be found on the Academic Integrity link on your laptop.

**13. Final Examinations**

Final examinations are held during the final examination period at the end of the semester and may take place in a different room and on a different day from the regularly scheduled class. Check the published Examination Schedule for a complete list of days and times.

Students are advised to obtain their Student ID Card well in advance of the examination period as they will not be able to write their examinations without it. Student ID cards can be obtained at the Campus ID Services, in G1004 in the Campus Recreation and Wellness Centre.

Students who are unable to write a final examination when scheduled due to religious publications may make arrangements to write a deferred examination. These students are required to submit a Request for Accommodation for Religious Obligations to the Faculty concerned as soon as possible and no later than three week prior to the first day of the final examination period.

Further information on final examinations can be found in Section 5.24 of the Academic Calendar.

**14. Freedom of Information and Protection of Privacy Act**

The following is an important notice regarding the process for submitting course assignments, quizzes and other evaluative material in your courses in the Faculty of Science.

As you may know, UOIT is governed by the *Freedom of Information and Protection of Privacy Act* (“FIPPA”).  In addition to providing a mechanism for requesting records held by the university, this legislation also requires that UOIT not disclose the personal information of its students without their consent.

FIPPA’s definition of “personal information” includes, among other things, documents that contain both your name and your Banner ID. For example, this could include graded test papers or assignments. To ensure that your rights to privacy are protected, the Faculty of Science encourages you to use only your Banner ID on assignments or test papers being submitted for grading. This policy is intended to prevent the inadvertent disclosure of your information where graded papers are returned to groups of students at the same time. If you still wish to write both your name and your Banner ID on your tests and assignments, please be advised that UOIT will interpret this as an implied consent to the disclosure of your personal information in the normal course of returning graded materials to students.

If you have any questions or concerns relating to the new policy or the issue of implied consent addressed above, please contact [accessandprivacy@uoit.ca](mailto:accessandprivacy@uoit.ca)

**15. Course Evaluations**

Student evaluation of teaching is a highly valued and helpful mechanism for monitoring the quality of UOIT’s programs and instructional effectiveness. To that end, course evaluations are administered by an external company in an online, anonymous process during the last few weeks of classes. Students are encouraged to participate actively in this process and will be notified of the dates. Notifications about course evaluations will be sent via e-mail, and posted on Blackboard, Weekly News and signage around the campus.

*UOIT is committed to the prevention of sexual violence in all is forms. For any UOIT student who has experienced Sexual Violence,* ***UOIT can help****. UOIT will make accommodations to cater to the diverse backgrounds, cultures, and identities of students when dealing with individual cases.*

*If you think you have been subjected to or witnessed sexual violence:*

                     *Reach out to a Support Worker, who are specially trained individuals authorized to receive confidential disclosures about incidents of sexual violence. Support Workers can offer help and resolutions options which can include safety plans, accommodations, mental health support, and more. To make an appointment with a Support Worker, call 905.721.3392 or email* [*supportworker@uoit.ca*](mailto:supportworker@uoit.ca)

                     *Learn more about your options at:* [*www.uoit.ca/sexualviolence*](http://www.uoit.ca/sexualviolence)

*Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact* [*studentlife@uoit.ca*](mailto:studentlife@uoit.ca) *for support.*

*Furthermore, please notify your professor if you are comfortable in doing so. This will enable them to provide any resources and help that they can.*