OntarioTech
UNIVERSITY

Faculty of Science

CSCI 4150U: Data Mining
Course outline for Winter 2021

1. **Course Details & Important Dates**

| Term | Course Type | Day | Time |
|---|---|---|---|
| Winter 2021 | Undergraduate | Monday | 9:40 AM – 11:00 AM |
| | | Thursday | 9:40 AM – 11:00 AM |

| Location | CRN # | Classes Start | Classes End | Final Exam Period |
|---|---|---|---|---|
| Synchronous SYN | 74882 | Jan. 11, 2021 | Apr. 9, 2021 | Apr. 14 - Apr. 25, 2021 |

| Important Date | Date |
|---|---|
| Family Day | Feb. 15, 2021 |
| Study break | Feb. 16 - 21, 2021 |

For other important dates go to:
https://ontariotechu.ca/current-students/academics/important-dates-and-deadlines.php

2. **Instructor Contact Information**

| Instructor Name | Office | Phone | Email |
|---|---|---|---|
| Heidar (Kourosh) Davoudi | UA 2015 | 905-721-8668 x 2779 | heidar.davoudi@ontariotechu.ca |
| Office Hours: Online (see Canvas) | | | |

| Laboratory/Teaching Assistant Name | Email |
|---|---|
| Marzieh Ahmadi | Marzieh.AhmadiNajafabadi@ontariotechu.ca |
| Aref Divshali | Aref.AbedjooyDivshali@ontariotechu.ca |

3. **Course Description**

This course introduces the fundamental concepts, principles and techniques in data mining. It provides students with the expertise to identify/define classic data mining problems and extract useful knowledge from raw data. The lectures introduce different data mining models and cover topics, such as data preprocessing, classification, clustering, anomaly detection, and association rule mining. The laboratories provide students with an opportunity to understand the data mining pipeline and gain hands-on experience on ideas discussed in lectures.

**4. Learning Outcomes**

On the successful completion of the course, students will be able to:
- Understand data mining techniques for solving well-known problems
- Apply data exploratory techniques to understand data in different domains
- Build, implement and adapt data mining models for a particular problem
- Analyze and compare the performance of models

**5. Course Design**

Lectures in this course will include both presented material, and interactive elements in online format. The classroom interaction will be designed to solidify concepts and techniques learned in the lectures. In order to achieve success in this course, students must attend all lectures. Students are expected to prepare a webcam/microphone and participate in class lectures and activities. 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 Canvas site. The TAs will supervise the laboratories and review main topics designed by the instructor through extra examples. The instructor and the TAs will collaborate on some of the marking. The instructor will submit the majority of classroom materials on Canvas. The primary communication between the instructor and student would be vis piazza.

**6. Outline of Topics in the Course (Subject to Change)**

1. Introduction to data mining
2. Data
3. Data Exploratory Analysis
4. Classification I (Basic Techniques)
5. Classification II (Alternative Techniques)
6. Clustering I (Basic Concepts and Techniques)
7. Clustering II (Advanced Concepts and Algorithms)
8. Anomaly Detection
9. Association Rule Mining

**7. Required Texts/Readings**

- Introduction to Data Mining (2'nd Edition), Pang-Ning Tan, Michael Steinbach, Anuj Karpatne, Vipin Kumar.
- Data Mining: Concepts and Techniques (2'nd Edition), Jiawei Han, Micheline Kamber, Jian Pei

**8. Evaluation Method**

| Component | Due Date | Weight |
| --- | --- | --- |
| In-class Activities Participation | NA | 5 % |
| Midterm Lab Report | Feb 26, 2021, 11:59 PM | 15 % |
| Final Lab Report | Apr 9, 2021, 11:59 PM | 15 % |
| Quiz #1 | Feb 8, 2021 (class time) | 15 % |
| Quiz #2 | Mar 8, 2021 (class time) | 15 % |
| Final Exam | TBA by the university | 35 % |

Final course grades may be adjusted to conform to program or Faculty grade distribution profiles.  Further information on grading can be found in:
   http://calendar.uoit.ca/content.php?catoid=22&navoid=879#Grading


**9.    Assignments and Tests**

Any student who misses an examination (or assignment/project submission deadlines) with a valid medical reason and documentation will have the weight of the examination (or assignment/project) added to other components. In other cases, students need to submit Academic Consideration Form after consultation with the course instructor. Covid-related absences need to be discussed with the instructor, and will be dealt with on a case-to-case basis.

**10.  Technology Requirements**

To support online learning, the university recommends certain technology requirements for laptops, software and internet connectivity which are available at: https://itsc.ontariotechu.ca/remote-learning.php.

Students experiencing technical difficulties such that they are unable to meet the technology requirements may contact the IT Service Help Desk at: servicedesk@dc-uoit.ca
Students experiencing financial difficulties such that they are unable to meet the technology requirements may contact Student Awards and Financial Aid Office at: connect@ontariotehu.ca

By remaining enrolled in this course, you acknowledge that you have read, understand and agree to observe the Recommended Technology Requirements for accessing university online learning resources, including those minimum requirements that are specific to your faculty and program.

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@ontariotechu.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.

**11.  Student Support**

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@ontariotechu.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.

**12.  Sexual Violence Support and Education**

Ontario Tech is committed to the prevention of sexual violence in all is forms. For any student who has experienced Sexual Violence, Ontario Tech can help. We 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, a specially trained individual authorized to receive confidential disclosures about incidents of sexual violence. Support Workers can offer help and resolution 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 studentlife@ontariotechu.ca
- Learn more about your options at: https://studentlife.ontariotechu.ca/sexualviolence/

**10.  Accessibility**

Students with disabilities may request to be considered for formal academic accommodation in accordance with the Ontario Human Rights Code. Students seeking accommodation must make their requests through Student Accessibility Services. Requests must be made in a timely manner, and students must provide relevant and recent documentation to verify the effect of their disability and to allow the university to determine appropriate accommodations.

Accommodation decisions will be made in accordance with the Ontario Human Rights Code. Accommodations will be consistent with and supportive of the essential requirements of courses and programs, and provided in a way that respects the dignity of students with disabilities and encourages integration and equality of opportunity. Reasonable academic accommodation may require instructors to exercise creativity and flexibility in responding to the needs of students with disabilities while maintaining academic integrity.

## 11. Academic Integrity

Students and faculty at Ontario Tech 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 Ontario Tech's regulations on Academic Conduct (see Academic regulations in 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, and 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 written reprimand to permanent expulsion from the university. A lack of familiarity with Ontario Tech'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.

In this course, specifically, examples of academic misconduct may include (but are not limited to) sharing work on individual assignments with anyone other than the TAs or the instructor, sharing work on group assignments with anyone outside of your group, sharing information (in person or electronically) with anyone other than the invigilators during a test, and using a tool to automatically generate code, graphs, or other product (unless explicitly permitted by the instructor).

## 12. Safety

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Learn more about your options at: www.uoit.ca/sexualviolence

**13. Students with Disabilities**

Accommodating students with disabilities at Ontario Tech 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.

**When on campus access is allowed,** students taking courses on north Oshawa campus can visit Student Accessibility Services in the Student Life Building, U5, East HUB (located in the Founders North parking lot). Students taking courses on the **downtown Oshawa campus** can visit Student Accessibility Services in the 61 Charles St. Building, 2nd Floor, Room DTA 225 in the Student Life Suite.

Disability-related 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, Monday to Friday, closed Wednesday's 8:30am – 10:00am. For more information on services provided, you can visit the SAS website at https://studentlife.ontariotechu.ca/services/accessibility/index.php. Students may contact Student Accessibility Services by calling 905-721-3266, or email studentaccessibility@ontariotechu.ca.

**When on campus access is allowed**, 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 https://disabilityservices.ontariotechu.ca/uoitclockwork/custom/misc/home.aspx. 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 two (2) weeks prior to the start of the final examination period. SAS will notify students of the registration deadline date.

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Extra support services are available to all Ontario Tech University students in academic development, study skills, counseling, and peer mentorship. More information on student support services can be found at https://studentlife.ontariotechu.ca/services/academic-support/index.php

**15. Online Test and Exam Proctoring (Virtual Proctoring)**

Ontario Tech University will conduct virtual monitoring of examinations in accordance with Ontario privacy legislation and all approved policy instruments.

**16. Final Examinations**

Final examinations are held during the final examination period at the end of the semester and **when on campus access is allowed,** 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 required to prepare microphone and Webcam for the case that the examination is online.

Students are required to show their Student ID card (campus ID) when **in-person examinations are allowed.** 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. More information on ID cards can be found at https://registrar.ontariotechu.ca/campus-id/index.php.

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 weeks prior to the first day of the final examination period.

Further information on final examinations can be found at https://usgc.ontariotechu.ca/policy/policy-library/policies/academic/procedures-for-final-examination-administration.php

**17. Student Course Feedback Surveys**

Student evaluation of teaching is a highly valued and helpful mechanism for monitoring the quality of Ontario Tech University'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 Canvas, Weekly News, and signage around the campus.

## University Response to COVID-19

The government response to the COVID-19 pandemic is continually evolving. As new information becomes available from federal and provincial public health authorities, the Province of Ontario and the Regional Municipality of Durham, Ontario Tech University will remain nimble and prepared to respond to government orders, directives, guidelines and changes in legislation to ensure the health and safety of all members of its campus community. In accordance with public health recommendations, the university may need to adjust the delivery of course instruction and the availability and delivery mode of campus services and co-curricular opportunities. Ontario Tech University appreciates the understanding and flexibility of our students, faculty and staff as we continue to navigate the pandemic and work together to demonstrate our strong commitment to academic, research and service excellence during these challenging and unprecedented times.

The Accessibility for Ontarians with Disabilities Act (AODA) standards have been considered in the development of this model course template and it adheres to the principles outlined in the University's Accessibility Policy.