

ACIT 4880

Introduction to Data Analytics

School	School of Computing and Academic Studies
Program	Computer Information Technology
Course Credits	4
Minimum Passing Grade	50%
Start Date	September 02, 2025
End Date	December 12, 2025
Total Weeks	15
Delivery Type	Lecture
Prerequisite(s)	<ul style="list-style-type: none">• ACIT 1630 and ACIT 2515 and MATH 1350
CRN	48507

Acknowledgement of Territories

The British Columbia Institute of Technology acknowledges that our campuses are located on the unceded traditional territories of the Coast Salish Nations of Skwxwú7mesh [1] (Squamish), səl̓ilwətaɣ̓ [2] (Tsleil-Waututh), and xwməθkwəy̓əm [3] (Musqueam).

Instructor Details

Name	Rafi Mohammad
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Location	DTC 528/Online
Office Hours	To be publised over D2L course home page

Course Description

This course introduces the concepts, techniques and tools needed to extract knowledge and information from data. The focus is on large data sets that would be found in a typical enterprise environment. Students will work with and analyze offline as well as online data. The course covers techniques for data cleaning, manipulation, analysis, and visualization.

Course Learning Outcomes/Competencies

Upon successful completion of this course, the student will be able to:

- Identify and apply data analytics techniques that are appropriate for a project's needs.
- Identify and apply data analytics techniques that are appropriate for a project's needs.
- Use current tools and techniques to clean and transform data in preparation for modeling and analysis.
- Create predictive models using appropriate statistical and data mining techniques.
- Apply appropriate statistical techniques to the modelling and analysis of data.
- Evaluate and interpret results in order to test claims and to support fact-based decision making.
- Use data visualization tools to effectively communicate the results of a data analysis project.

Learning Resources

Software	<ul style="list-style-type: none">• Python• Anaconda• Google Colab• VS Code• Tableau• Excel
Texts and References	<p>Ref1: Discovering Knowledge in Data: An Introduction to Data Mining, 2nd edition, 2014, by Daniel T. Larose and Chantal D. Larose.</p> <p>Ref2: Python Data Analysis, Feb 2021, by Avinash Navlani, Armando Fandango, and Ivan Idris.</p>

Course Goals

- Data cleansing for data analysis
- Apply data analytic techniques for knowledge extraction
- Create stable and accurate data analytic models for data classification, data regression, and data clustering
- Create data visualization dashboards using Tableau
- Apply data analytic techniques using Excel and Python
- Apply concepts covered to progressively complex problems
- Solve data analytics related problems under time pressure/constraint
- Collaborative effectively in a team environment

Evaluation Criteria

Criteria	%	Comments
In-class Labs	10	Open book/resource.
Quizzes	20	Three quizzes will take place at the beginning of any three classes to cover the flipped component.
Projects	30	Two projects occur - one in the first half of the term, and one in the second half of the term.
Final Exam	40	Closed-book/resource exam covering the entire course materials.

Attendance Requirements

Regular attendance in classes is critical to student success and is monitored. Unapproved absence of 2 or more classes may result in withdrawal from the course or program. Please see Policy 5101 – Student Regulations: <https://www.bcit.ca/files/pdf/policies/5101.pdf> [4]

Course Specific Requirements

Prerequisite skills or knowledge required by students for this course:

- Python
- Statistics and Math concepts

The usage of AI is allowed only for learning but not for labs, exams, and projects. Any direct copy-paste from AI would result in a penalty.

Other information

Relevant recordings/tutorials will be provided for holidays (such as Remembrance Day and Truth and Reconciliation Day) that overlap with Tuesday classes. Students who have class on Holiday Tuesdays are expected to watch the recordings/tutorials instead of coming to class. In-class tasks on these Holiday Tuesdays will be rescheduled accordingly.

Statement for prior learning assessment

The use of Artificial Intelligence is only permitted for learning. It is not allowed to use AI without a 100% understanding.

Course Schedule and Assignments

Week	The week starts on	Topics	In-class Activities	Flipped
1	01-Sep	Introduction to data analytics and Jupyter Notebook	Lab1	Tools setup/ installation
2	08-Sep	Introduction to Numpy	Lab2	Reading: Chap1 from Ref2
3	15-Sep	Introduction to Pandas	Lab3	Reading: Chap2 from Ref2
4	22-Sep	Data Preprocessing (Part 1)	Lab4	Reading: Chap1 & Chap2 from Ref1
5	29-Sep	Data Preprocessing (Part 2) Sept 30th National Day for Truth and Reconciliation (Tuesday class recordings/tutorials will be provided. Students in Tuesday's classes are expected to watch the recordings/tutorials instead of coming to class. In-class tasks will be rescheduled accordingly.) October 1st Class will take place.	Lab5	Reading: Chap3 from Ref1
6	06-Oct	EDA and Data Visualization	Lab6	Reading: Chap4 from Ref1
7	13-Oct	Statistical Analysis	Lab7	
8	20-Oct	Midterm Week	No Class	

9	27-Oct	Regression Analysis	Lab8	Reading: Chap6 from Ref1
10	03-Nov	Classification Algorithms	Lab9	Reading: Chap7 from Ref1
11	10-Nov	Advanced Classification Algorithms November 11th Remembrance Day (Tuesday class recordings/tutorials will be provided. Students in Tuesday's classes are expected to watch the recordings/tutorials instead of coming to class. In-class tasks will be rescheduled accordingly.) November 12th Class will take place.	Lab10	Reading: Chap8 from Ref1
12	17-Nov	Clustering Algorithms	Lab11	Reading: Chap9 from Ref1
13	24-Nov	Final Project Presentations		
14	01-Dec	Review week		
15	08-Dec	Final Exam Week		

Course topics

- Introduction to Python / Python Data Structures
- Numpy/ Pandas
- Data Preprocessing/ Visualization
- Exploratory Data Analysis
- Statistical Analysis
- Regression Analysis
- k-Nearest Neighbor Algorithm
- Decision Trees
- Random Forest
- Hierarchical & k-Means Clustering

BCIT Policy

The following statements are in accordance with the BCIT Policies 5101, 4501, 5103, 5104, and 7507, and their accompanying procedures. To review these policies and procedures please click on the links below.

Attendance

In case of illness or other unavoidable cause of absence, the student must communicate as soon as possible with their instructor or Program/Department Head, stating the reason for the absence. When absences result in missed safety requirements, exams, or other deadlines, an instructor or Program/Department Head may request appropriate supporting documentation, including a medical note. For all other absences, the student is responsible to ensure they seek out missed information, preferably from a classmate or recording (when available). Please see [BCIT Policy 5101 - Student Regulations \[5\]](#), and accompanying procedures, for more information.

Attempts

As stated in [BCIT Policy 5103 - Student Evaluation \[6\]](#), students must successfully complete a course within a maximum of three (3) attempts at the course. Students with two attempts in a single course will be allowed to repeat the course only upon permission from the Associate Dean. Students who have not successfully completed a course within three attempts will not be eligible to graduate from their respective program. For those courses or programs that have Education Council approval, the number of attempts as stated in the evaluation section of the course outline shall apply.

Academic Integrity

It is the responsibility of all students to be familiar with the Student Code of Academic Integrity. Violations of the Code, including plagiarism, cheating, misrepresentation, and academic advantage, are prohibited and will be handled in accordance with [BCIT Policy 5104 – Student Code of Academic Integrity \[7\]](#), and accompanying procedures.

Accommodation

Any student who may require accommodation from BCIT because of a physical or mental disability should refer to [BCIT's Policy 4501 - Accommodation for Students with Disabilities \[8\]](#), and contact BCIT's Accessibility Services (SW1 2360, 604-451-6963) at the earliest possible time. Requests for accommodation must be made to Accessibility Services, and should not be made to a course instructor or Program area.

Any student who needs special assistance in the event of a medical emergency or building evacuation (either because of a disability or for any other reason) should promptly inform their course instructor(s) and Accessibility Services of their personal circumstances.

Human Rights, Harassment and Discrimination

The BCIT community is made up of individuals from every ability, background, experience and identity, each contributing uniquely to the richness and diversity of the BCIT community as a whole. In recognition of this, and the intrinsic value of our diversity, BCIT seeks to foster a climate of collaboration, understanding and mutual respect between all members of the community and ensure an inclusive accessible working and learning environment where everyone can succeed. [Respect, Diversity, and Inclusion \[9\]](#) is a supportive resource for both students and employees of BCIT, to foster a respectful learning and working environment. Any student who feels that they are experiencing discrimination or harassment (personal or human rights-related) can confidentially access this resource for advice and support. Please see [BCIT Policy 7507 – Harassment and Discrimination \[10\]](#) and accompanying procedure.

Students should make themselves aware of additional Education, Administration, Safety and other BCIT policies listed at <https://www.bcit.ca/about/administration/policies.shtml> [11]

Guidelines for School of Computing and Academic Studies

No school specific policies, please refer to main BCIT Policy.

Approved

I verify that the content of this course outline is current.

Rafi Mohammad, Instructor

September 08, 2025

I verify that this course outline has been reviewed.

Thomas Lane, Program Head

September 08, 2025

I verify that this course outline has been reviewed and complies with BCIT policy.

Donna Turner, Associate Dean

September 08, 2025

Note: Students will be given reasonable notice if changes are required to the content of this course outline.

*Course hours and credits are calculated per [Policy 5012 \[12\]](#) and the [associated procedure \[13\]](#).

Total hours – Example of 3 credit lecture/lab course:

- **Full-time course:** 45 hours of scheduled learning
- **Flexible Learning course:** 36 hours of scheduled learning plus 9 hours of independent (non-scheduled, non-instructional) learning

List of links found on this page

This list includes all links found on this page for your reference.

- [1] <https://www.squamish.net/>
- [2] <https://twonation.ca/>
- [3] <https://www.musqueam.bc.ca/>
- [4] <https://www.bcit.ca/files/pdf/policies/5101.pdf>
- [5] <https://www.bcit.ca/files/pdf/policies/5101.pdf>
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