Course Outline

MATH3903
Mathematics for Data Analytics
Fall 2023 - Current

MATH3903 Mathematics for Data Analytics

COURSE DESCRIPTION

This course is specifically focused towards supporting the mathematical principles required to apply the concepts of data analysis and big data analytics. Learners apply concepts such as probability, distributions, regression, topological analysis, and descriptive and inferential statistics to data-related contexts.

REQUISITES	None
EQUIVALENTS	None
CREDITS	3
HOURS	45
ELIGIBLE FOR PLAR	No
ZERO TEXTBOOK COST	No

COURSE COMPETENCY

COMPETENCY TITLE
Perform mathematical operations required for data analytics

COMPETENCY STATEMENT

Data Management and Analytics professionals are required to apply mathematical concepts and procedures to extract, clean, wrangle, analyze, and visualize data.

COMPETENCY DESCRIPTION

The field of data management and analytics is based on a foundation of mathematics principles, primarily related to statistics and probability. Data analysts must be able to apply probability, distributions, regression, topological analysis, and descriptive and inferential statistics in a data context. These foundational skills are required in order to be competent in the Acquiring and Wrangling Data, Performing Data Analysis, and Visualizing Data and Insights competencies.

COURSE LEARNING OUTCOMES

Bow Valley College is committed to ensuring our graduates can demonstrate their abilities in key areas that will make them effective citizens and encourage their development as lifelong learners. In addition to the discipline-specific skills that learners acquire in their programs, the College has identified ten learning

outcomes.

College-Wide Outcomes:

1. Communication
2. Thinking Skills
3. Numeracy and Financial Literacy
4. Working with Others
5. Digital Literacy
6. Positive Attitudes and Behaviours
7. Continuous Learning
8. Health and Wellness Awareness
9. Citizenship and Intercultural Competence
10. Environmental Sustainability

#	COURSE LEARNING OUTCOME(S)	COLLEGE WIDE OUTCOMES SUPPORTED
1	Create data summaries by applying mathematical and statistical theory.	1, 2, 3, 5, 6
2	Use graphical and numerical methods to describe data.	1, 2, 3, 5, 6
3	Use statistical methods to test a hypothesis.	1, 2, 3, 5, 6
4	Apply the appropriate regression model to describe relationships in bivariate and multi-variate data.	1, 2, 3, 5, 6

LEARNING PATHWAY

The time it takes learners to demonstrate competencies will vary. An example of a suggested schedule for learning and development is shown below. Learners will need to plan out their assessment attempts within their course. For additional information, please consult the Course Offering Information in Brightspace.

WEEK/HOURS LEARNING AND DEVELOPMENT PLAN

1	Review Rubric and Learning Pathway
2	Create a Success Plan; Create a data summary
3	Determine the most appropriate method of collecting data
4	Construct and interpret graphical displays of various data types
5	Compute and interpret mean and standard deviation
6	Analyze bivariate data to interpret relationships
7	Calculate and interpret probabilities
8	Construct and interpret probability distributions
9	Calculate means and variability based on a sample
10	Construct and interpret a confidence interval using a single sample
11	Test a hypothesis using a single sample
12	Calculate statistical components using a simple linear regression model
13	Calculate statistical components using a multiple regression model
14	Complete Exams
15	Complete Exams

COURSE MODULES AND SCHEDULE

Course schedule subject to change, depending on delivery mode and term of study. For exact dates, please consult the Course Offering Information in Brightspace.

WEEK/HOURS	MODULES
1	Statistics, data, and methods to describe data
2	Statistics, data, and methods to describe data
3	Statistics, data, and methods to describe data
4	Introduction to probability
5	Discrete probability distributions
6	Discrete probability distributions
7	Continuous probability distributions
8	Sampling methods and central limit theorem
9	Reading Week
10	Confidence intervals, hypothesis testing, and ANOVA
11	Confidence intervals, hypothesis testing, and ANOVA
12	Regression and correlation
13	Regression and correlation
14	Time series analysis
15	Final assessment

ASSESSMENT

This course follows an assessment-first approach, in which learners will be assessed, and receive structured feedback, and a personalized learning plan. Learners will also receive differentiated support from an instructor based on their individual needs.

Learners will have a variety of ways to demonstrate they have met the required competency through the demonstration of learning outcomes and criteria as laid out in the rubric. Learners will have multiple (but not unlimited) attempts to prove competency. It is suggested that learners plan out their assessment attempts within their course.

Learners will have flexibility in how they satisfy course learning outcomes while still adhering to the criteria found in the rubric and the Course Offering information. Please refer to the Course Offering Information and the rubric in Brightspace for additional information.

COURSE LEARNING OUTCOMES	ASSESSMENT
1, 2, 3, 4	Exams (minimum of 3)

ASSESSMENT

COURSE LEARNING OUTCOME(S)	ASSESSMENT	WEIGHT
1, 2, 3, 4	Term exams (Minimum of 2)	30%
1, 2, 3, 4	Case study (individual or group)	30%
1, 2, 3, 4	Assignments	25%
1, 2, 3, 4	Learning activities	15%

Important: For details on each assignment and exam, please see the Course Offering Information.

PERFORMANCE STANDARDS

A minimum grade of D is required to pass this course. However, a program may require a higher grade in this course to progress in the program or to meet specific program completion requirements.

Please consult with the program area or contact the program chair for further details. A minimum Grade Point Average of 2.0 is required for graduation.

GRADING SCHEME

Grade	Percentage	Grade Point	Description
A+	95-100	4.0	Exceptional: superior knowledge of subject matter
A	90-94	4.0	Excellent: outstanding knowledge of subject matter
A-	85-89	3.67	
B+	80-84	3.33	
B	75-79	3.0	Very Good: knowledge of subject matter generally mastered
B-	70-74	2.67	
C+	67-69	2.33	

C	64-66	2.0	Satisfactory/Acceptable: knowledge of subject matter adequately mastered
C-	60-63	1.67	
D+	57-59	1.33	
D	50-56	1.0	Minimal Pass
F	Less than 50	0.0	Fail: an unsatisfactory performance

REQUIRED LEARNING RESOURCES

Lind, D. A., Marchal, W. G., Wathen, S. A., Waite, C. A., & Murphy K. (2022). *Basic statistics for business and economics with Connect, Proctorio Plus and MegaStat package* (7th ed.). McGraw-Hill Education.

ISBN: 9781265323486

Additional learning resources may be found in the Course Offering Information or in Brightspace.

ADDITIONAL INFORMATION

Additional information may be found in the Course Offering Information or in Brightspace.

ACADEMIC ACCOMMODATIONS

Learners with a disability (learning, physical, and/or mental health) may qualify for academic and exam accommodations. For more information, or to apply for accommodations, learners should make an appointment with Accessibility Services in the Learner Success Services (LSS) Department. Accessibility Services can also assist learners who may be struggling with learning but do not have a formal diagnosis. To make an appointment visit LSS on the first floor of the south campus or call 403-410-1440. It is the learner's responsibility to contact Accessibility Services and request academic accommodations. For more information, please visit our website at http://www.bowvalleycollege.ca/accessibility.

INSTITUTIONAL POLICIES

Bow Valley College is committed to the highest standards of academic integrity and honesty. Learners are urged to become familiar with and uphold the following policies: Academic Integrity (500-1-7), Learner Code of Conduct, Procedures and Guidelines (500-1-1), Learner Appeals (500-1-12), Attendance (500-1-10), Grading (500-1-6), Academic Continuance and Graduation (500-1-5), and Electronic Communications (300-2-13). Audio or video recording of lectures, labs, seminars, or any other teaching and learning environment by learners is allowed only with consent of the instructor as part of an approved accommodation plan. Recorded material is to be used solely for personal study and is not being used or distributed without prior written consent from the instructor.

Turnitin:

Students may be required to submit their course work to Turnitin, a third-party service provider engaged by BVC. Turnitin identifies plagiarism by checking databases of electronic books and articles, archived webpages, and previously submitted student papers. Students acknowledge that any course work or essays submitted to Turnitin will be included as source documents in the Turnitin.com reference database, where it will be used solely to detect plagiarism. The terms that apply to a student's use of Turnitin are described on Turnitin.com.

Online Exam Proctoring:

Examinations for this course may require proctoring through an online proctoring service. Online proctoring enables online exam taking within a controlled and monitored environment, thereby enhancing academic integrity. Online proctoring may occur through a variety of methods, including but not limited to:

a. live online proctoring where a remote invigilator authenticates identity and observes completion of an exam using specialized software and recordings;
b. automated proctoring where the exam session is recorded and AI (artificial intelligence) analyzed;
c. browser lockdown that limits access to other applications, websites, copying, printing, screen capture and other functions; or
d. a combination of both live/automated proctoring and browser lockdown.

Course instructors will review recordings, analyses, and data obtained through online proctoring for academic integrity infractions. It is the student's responsibility to meet the technical, software, location, and identity verification requirements necessary to enable online proctoring.

Further details of these policies are available in the Academic Calendar and on the Bow Valley College website, bowvalleycollege.ca.

Learners are encouraged to keep a copy of this course outline for future reference.

Collection of Personal Information:

This course, including your image and voice, may be recorded and made available to you and other students taking the course section. By attending the class(es) online or in person, you consent to the collection of your

personal information. If you do not wish to be recorded, please contact your instructor before starting the course/class to discuss alternative arrangements.

You may use the recordings only for educational purposes and you must not copy, share, or use the recordings for any other purpose without the instructor's express permission.

Your personal information is collected in accordance with section 33(c) of the Freedom of Information and Protection of Privacy Act (Alberta) to deliver academic programming, support learner flexibility, promote universal design for learning principles, and for purposes consistent with the course activities and outcomes. If you have any questions about the collection, disclosure, use, or protection of this information, please contact the College's Access and Privacy Officer at foip@bowvalleycollege.ca.