



OMIS5120 S2021 CREDITS: 1.50

OMIS 5120 S - QUANTITATIVE METHODS

TUE 19:00-22:00 N/A

INSTRUCTOR

Michael Rochon

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ADMIN

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🏠 S337N SSB

Canada Day: July 1, 2021 - University Closed**Civic Holiday: August 2, 2021 - University Closed****IMPORTANT:**

Requirements: A stable and sufficient Internet connection is required for the entire course including the Midterm. A non-programmable calculator will be allowed during the test.

This course contains synchronous and asynchronous components. Lecture material will be asynchronous and will be available on Canvas each week and will comprise of approximately 3 hours of lecture time. Zoom session's will be synchronous and will be held each week for questions and discussions on the material for the week and limited to 1 to 2 hours.

Asynchronous Course Material: Course content will be delivered in PPSX format and MP4 format. Warning: Distribution or redistribution of course content is STRICTLY PROHIBITIVE. All material is copyrite protected and is for the use solely of this 5120 course.

MICHAEL ROCHON BIOGRAPHY

Since 2008, Michael Rochon has taught Decision Sciences, Quantitative Methods, Marketing Research, Sample/Survey Design and other courses at York University. Michael Rochon was involved in many research initiatives in the financial, health, logistics, publishing and retail sector and has been a pioneer in web and eCommerce based analytics and technologies.

BRIEF DESCRIPTION

An introduction to the use of quantitative methods for business research, analysis, forecasting and optimization. The aim is to convey not only an understanding of methods, but also to give an appreciation of their use in addressing actual business problems, and to acquaint students with computer software necessary for implementing these methods.

COURSE LEARNING OUTCOMES

An introduction to the use of quantitative methods for business research, analysis, forecasting and decision making. The aim is to convey not only an understanding of methods, but also to give an appreciation of their use in addressing actual business problems, and to acquaint students with computer software necessary for implementing these methods. Problems revolving around economic, social, human, and environmental sustainability will be touched on throughout the course. This includes ethical considerations around the collection, interpretation and use of statistical information.

Managers are faced with a multitude of important decisions on a daily basis. The purpose of this course is to provide managers with the tools to be more effective decision makers through the use of insights generated through quantitative analysis. Data, when effectively organized, combined and compared, allows businesses to become more efficient and profitable, better understand their customers, price their products more effectively, and gain a competitive advantage. Ineffective use of data or use of inappropriate data can similarly lead to erroneous conclusions, bad decisions, ethical dilemmas, and sustainability concerns. In this course you will gain familiarity with structured approaches to working with data to generate improved results.

Organization of the course

The course begins by looking at data itself – students will have the opportunity to critically analyze the information needs of an organization in various contexts and to determine what data would best address a particular business question. We will then move on to decision making itself – recognizing that decisions are often made in a context of uncertainty. Students will have hands-on practice in structuring decision problems and will also explore the potential benefits of additional information gathering to improve decision making effectiveness. Recognizing that the desired data is not always available directly, students will develop skills in building models to predict required information as well as understand relationships between data to generate the deeper insight that leads to superior decisions.

To achieve these objectives, students will be engaged in active problem solving in class sessions, generally in the form of analysis of a real world problem setting (often in case format). Case discussions will have their foundations in insights generated from data analysis, and students will be encouraged to explore the ethical and sustainability issues surrounding their conclusions. This will be supplemented by background reading and individual practice to solidify learning. Students will demonstrate their mastery of concepts and approaches through individual homework assignments and formal testing.

LEARNING REMOTELY

Due to the COVID-19 situation, this course will run in an online format. All students are expected to have the following technology to participate in this course:

1. Computer
2. High speed internet

3. Web camera
4. Microphone

Students are responsible for ensuring they have the equipment needed and corresponding practices in place (e.g., ability to tether to hotspot in the event of an internet outage, data backup strategy in the event of computer failure) to ensure they can complete course requirements.

Several platforms will be used in this course (e.g., Canvas, Zoom, etc.) through which students will interact with the course materials, the instructor, as well as with one another. Please review the technical specifications for **Zoom** (<https://support.zoom.us/hc/en-us/articles/201362023-System-Requirements-for-PC-Mac-and-Linux>) and **Canvas** (<https://community.canvaslms.com/t5/Canvas-Basics-Guide/What-are-the-browser-and-computer-requirements-for-Canvas/ta-p/66>). Please review the syllabus to determine how the class meets (in whole or in part) and how presentations will be conducted. Students shall note the following:

- Zoom is hosted on servers in the U.S. This includes recordings done through Zoom.
- If you have privacy concerns about your data, provide only your first name or a nickname when you join a session.
- The system is configured in a way that all participants are automatically notified when a session is being recorded. In other words, a session cannot be recorded without you knowing about it.

Copying of any Zoom recordings or other course materials for public or commercial distribution is strictly prohibited and may lead to copyright and/or privacy law violations.

Technical Issues

Students who are unable to submit an assignment or exam due to technical issues with their computer, network connection or learning tools should immediately email a copy of their work to their instructor, and then complete and email a **Technical Issues Form** to their instructor. For Exams, please also review complete all requirements from the policy page of the syllabus.

COURSE MATERIAL

The **required text** for this course is:

Camm, Cochran, Fry, Ohlmann, Anderson, Sweeney and Williams: Business Analytics, 3rd ed., Cengage Learning, 2019. ISBN #9781337406420 / 1337406422.

The textbook can be purchased from the York Bookstore (<https://www.bookstore.yorku.ca> (<https://www.bookstore.yorku.ca/>)).

Note: we will only be covering certain chapters and sections of the text in this introductory course. There are additional topics provided in the text that you may wish to explore in the future. This course provides the foundation for you to build on as you continue to develop your quantitative analysis skills in other Schulich courses and beyond.








An online learning platform CANVAS has been created for this course. It contains information and materials specific to this course, including lecture slides, practice problems and information regarding additional readings. Check it frequently! You will also access and submit exams via Canvas. Because of the large volume of information available on Canvas, information will be grouped by topic (lectures, general information, practice materials, exams, etc.).

Copyright

Course materials, such as lectures, PowerPoint slides, tests, course notes, outlines, and similar materials, are protected by copyright. As creator of those materials the instructor(s) is the exclusive copyright owner. You may take notes and make copies of course materials for your personal use. However, you may not reproduce or distribute the course materials (e.g. uploading that content to a commercial website) without my express written permission.


Third party copyrighted materials (such as book chapters, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law. Copying this content for distribution may lead to a violation of Copyright law.

ASSIGNMENT SUMMARY

| Assignment Task | Group Individual | Total % of Final Grade | Due Date |
|---|---|------------------------|---------------------------------|
| Assignments (Best 4 out of 5) 20% 1 lowest will be dropped | | | |
| Assignment 1 |  | 5% | Tue Jun 29, 2021 at 07:00pm EDT |
| Assignment 2 |  | 5% | Tue Jul 6, 2021 at 07:00pm EDT |
| Assignment 3 |  | 5% | Tue Jul 13, 2021 at 07:00pm EDT |
| Assignment 4 |  | 5% | Tue Jul 20, 2021 at 07:00pm EDT |
| Assignment 5 |  | 5% | Tue Jul 27, 2021 at 07:00pm EDT |
| Midterm Exam 40% | | | |
| Midterm Exam |  | 0% | Tue Jul 13, 2021 at 07:00pm EDT |
| Final Project 40% | | | |
| Final Project - DUE August 9th before 1pm EST |  | 40% | Mon Aug 9, 2021 at 01:00pm EDT |

WRITTEN ASSIGNMENTS: DESCRIPTIONS

Assignment 1.


 **Due Date:** Tue Jun 29, 2021 at 07:00pm EDT

Mini-assignments reinforcing the concepts covered in each lecture will be due the following week at the beginning of class. Assignments can be found in the following weeks lecture section, on Canvas, as that is when it is due. They will typically consist of a short exercise or problem, some of which may be drawn from the textbook. Students are expected to submit 4 assignments over the course of the term.

Max length: as required

Value: 5% each

Assignment 2.


 **Due Date:** Tue Jul 6, 2021 at 07:00pm EDT

Mini-assignments reinforcing the concepts covered in each lecture will be due the following week at the beginning of class. Assignments can be found in the following weeks lecture section, on Canvas, as that is when it is due. They will typically consist of a short exercise or problem, some of which may be drawn from the textbook. Students are expected to submit 4 assignments over the course of the term.

Max length: as required

Value: 5% each

Assignment 3.

 **Due Date:** Tue Jul 13, 2021 at 07:00pm EDT

Mini-assignments reinforcing the concepts covered in each lecture will be due the following week at the beginning of class. Assignments can be found in the following weeks lecture section, on Canvas, as that is when it is due. They will typically consist of a short exercise or problem, some of which may be drawn from the textbook. Students are expected to submit 4 assignments over the course of the term.

Max length: as required

Value: 5% each

Assignment 4.


 **Due Date:** Tue Jul 20, 2021 at 07:00pm EDT

Mini-assignments reinforcing the concepts covered in each lecture will be due the following week at the beginning of class. Assignments can be found in the following weeks lecture section, on Canvas, as that is when it is due. They will typically consist of a short exercise or problem, some of which may be drawn from the textbook. Students are expected to submit 4 assignments over the course of the term.

Max length: as required

Value: 5% each

Assignment 5.


 **Due Date:** Tue Jul 27, 2021 at 07:00pm EDT

Mini-assignments reinforcing the concepts covered in each lecture will be due the following week at the beginning of class. Assignments can be found in the following weeks lecture section, on Canvas, as that is when it is due. They will typically consist of a short exercise or problem, some of which may be drawn from the textbook. Students are expected to submit 4 assignments over the course of the term.

Max length: as required

Value: 5% each

Midterm Exam.


 **Due Date:** Tue Jul 13, 2021 at 07:00pm EDT

The midterm exam will be an online exam before the 4th lecture session. It will consist of both quantitative and qualitative questions and may include a mix of problems and/or multiple choice questions. Topics covered will include material from the first 3 lectures. Students are expected to have a non-programmable calculator.

Max length: 1.5 hours

Value: 40%

Final Project - DUE August 9th before 1pm EST.

 **Due Date:** Mon Aug 9, 2021 at 01:00pm EDT

The final project will consist of a case analysis drawing on the skills developed during the last 3 lectures of the course. Students will be organized into groups of 4-8 by the instructor (depending on class size). Groups will take on the role of consultant in analyzing a realistic business situation, providing insights and recommendations to management based on their quantitative analysis of data provided. The final deliverable is a formal management report with relevant quantitative appendices to support the findings. Details regarding the project will be posted on Canvas. The final project is due 1 approximately week after the last lecture.

Value: 40%

WRITTEN ASSIGNMENTS: EVALUATION

The student's grade in the course is computed from his/her performance on assignments, a midterm exam and a final project. Numerical grades will be assigned to each component and the results will be aggregated as described in "Deliverables at a Glance". **Mini-assignments will be graded on a 5 point scale – completion of the assignment to an acceptable standard will earn 4/5; in rare cases, when work on a homework assignment goes significantly beyond expectations and is truly exceptional, a grade of 4.5 to 5 may be assigned.**

Students are expected to hand in work for grading in a timely fashion. Late work will not be accepted without prior approval of the instructor (exceptional circumstances only). Schulich policies will be followed with regards to missed exams.

CLASS-BY-CLASS SYLLABUS

Orientation



Orientation - READ FIRST PLEASE

General and Technical Information



How To Load Data Analysis



Textbook and Online Resource Information

Class 1 - Introduction to Data

Jun 22/21

Overview 1: Introduction to Data

Introduction to Data

Business decisions are complex and challenging. Decision making is improved by correct interpretation of relevant data. In today's environment, vast quantities of data of various types is readily available. The challenge is to select the most relevant data and to transform it effectively into information that generates insight for management decision making. Simple methods can generate significant insight. But there are also common traps that can lead to incorrect interpretations and bad decisions. In this session we will explore:

What type of data do I need and how should it be arranged? (Types of Data, Modifying Data)

What is typical/"average"? (Measures of Location)

What should we normally expect? (Distributions and Variability)

How is data related? (Measures of Association)

How best to see and show what is going on? (Data Visualization)

What errors or pitfalls might lead to misinterpreting data and what are the ethical and sustainability implications?

Read: Chapters 1 and 2

Background: Parts of Chapter 3

Class 2 - Decision Making Under Certainty and Framing Complex and Uncertain Situations

Jun 29/21

Overview 2 - Decision making Under Uncertainty and Framing Complex and Uncertain Situations

Decision Making Under Uncertainty

Many business decisions are challenging because at least some of the circumstances affecting the success of the decision are beyond the decision maker's control. In the next 2 sessions we will explore a framework for structuring and quantitatively evaluating complex decisions.

Framing Complex and Uncertain Situations

In this session we will work with the diagrammatic framework of a decision tree to represent and analyze complex decisions. Through the use of probability, we will be able to quantify uncertainty and incorporate it into our decision-making process. These techniques can often lead to ethical dilemmas on how probabilities are derived, how they are used and how economic and human sustainability is impacted. Triple bottom line considerations are also demonstrated in this section with a Hospital example.

Read: Chapter 5 - sections 5.1, 5.2 and 5.3

Read: Chapter 15 - sections 15.1, 15.3, 15.4 and 15.5

Due: Assignment 1

Class 3 - Sensitivity and Value of Information

Jul 6/21

Overview 3 - Sensitivity and Value Information

Sensitivity and Value of Information

Prioritization and cost effectiveness are keys to managing effectively. In addition to exploring more complex decision problems in this session, decision trees will also be used to develop risk profiles, understand how changes in probabilities or outcomes will affect the decision, and evaluate the cost effectiveness of gathering additional information in an effort to reduce uncertainty. Economic sustainability examples

(Burlington Airpark, Silicone Dynamics, Quality Control, Bidding Problem) are provided along with a look at social sustainability (Scorpion Video).

Read: Chapter 15 - sections 15.1, 15.3, 15.4 and 15.5

Due: Assignment 2

Class 4 - Regression Models and Simple Linear Regression

Jul 13/21

Overview 4 - Regression models and Linear Regression

MIDTERM EXAM

Regression Models

Deeper understanding of business situations is central to improved decision making. One way to develop this deeper understanding is by recognizing relationships between data. Sometimes we lack the information we need but may be able to infer it indirectly from other observable values. In the remaining 3 sessions, we will explore regression as a tool for understanding relationships between data and for predicting information necessary for decision making when it is not directly available. Through a deeper understanding of these concepts, we touch on triple bottom line and economic sustainability through the Serenity Watch Co example. In addition, further articles are provided dealing with ethical dilemmas in using this type of analysis (Target).

Simple Linear Regression

With simple linear regression, we explore the link between one variable and another:

- Are 2 factors related to each other? If so, how?
- How strong is the relationship?
- How reliably can you predict one factor from another?

Read: Chapter 7 - sections 7.1-7.3

Due: Assignment 3

Class 5 - Multiple Regression

Jul 20/21

Overview 5 - Multiple Regression

Multiple Regression

To begin this session, we will complete our exploration of simple regression models by completing our assessment of model quality. We will discover that, like many business problems, relationships can also be more complex and it may require the integration of several different factors to more fully explain the phenomenon we are interested in. In this session, we will focus primarily on multiple linear regression and its associated challenges, including expanding our ability to evaluate model quality in this context. Through our discussion, we will be covering material that considers social, human and economic sustainability elements through various examples (WiseMart and HR Hiring). These examples will also bring to surface ethical issues revolving around the use of data.

Read: Chapter 7

Due: Assignment 4

Class 6 - Multiple Linear Regression and Time Series

Jul 27/21

Overview 6 - Multiple Linear Regression and Time Series

Multiple Linear Regression and Time Series

In this session, we will return to the question of data relevance as we work together to select relevant data and use the results of our regression analyses to sift through the available data to find the most relevant factors for understanding and prediction. In addition to experiencing the iterative model building process from beginning to end in a more complex model scenario, we will explore other types of data and relationships. The topics in this session can be tailored to the interests of each student group and could include:

- categorical independent variables,
- non-linear relationships, and/or
- using regression analysis for forecasting time-based data (trend and/or seasonality).

Many of the examples in this section touch on economic sustainability with ethical implications to using the data (Unique Visits, Umbrella sales, SmartTech). Also, human and social sustainability will be considered in this section (SignalTech).

Read:

1. Chapter 7
2. (time permitting) Chapter 8 – sections 8.1 and 8.4

Due: Assignment 5

Final Project

Final Project - DUE August 9th before 1pm EST

STUDENT PREPARATION FOR CLASS AND CLASS PARTICIPATION: EXPECTATIONS

Preparation

The material in this course requires practice to gain proficiency. Reading the textbook and attending lectures provides the foundation for conceptual understanding and learning. However, it is through exposure to solving a variety of problems that true mastery is gained. The best way to discover how much you know is to try to solve a problem. You will learn the most if you first attempt solving a

problem on your own before seeking help. While working in groups is helpful to take your understanding to the next level, it is advisable to first attempt to solve problems individually before meeting with a study group to compare answers and share solution approaches or seeking help during office hours.

Some suggested practice problems will be provided on the CMD for each of the topic areas we will explore, but you do not need to limit yourself to these problems. The textbook provides solutions to even numbered problems and many other problems are available through a variety of sources. Your instructor can provide suggestions for anyone looking for additional practice resources.

Class Participation (contribution)

As lecture sessions will involve a significant component of active problem solving, students may find it helpful to bring technology to class. In particular, we will be making regular use of Excel as we explore different aspects of quantitative analysis. Students will be expected to work on short cases and problems individually and in groups during class sessions and individuals or groups may be called upon to share their analysis with the class. Active participation in class has been shown to positively correlate with class performance.

GENERAL SCHULICH ACADEMIC POLICIES

Grading

Grades at Schulich are based on a 9-value index system. The top grade is A+ (9) and the minimum passing grade is C- (1). To keep final grades comparable across courses, sections of required core courses are normally expected to have a mean grade between 4.7 and 6.1. Elective courses are expected to have a mean grade between 5.2 and 6.2.

The Schulich School does not use a percentage scale or prescribe a standard conversion formula from percentages to letter grades. Conversions within a course are at the discretion of the instructor.

For more details on the index, grading policy, and grade point average (GPA) requirements, consult your student handbook.

Academic Honesty

Academic honesty is fundamental to the integrity of university education and degree programs, and applies in every course offered at Schulich. Students should familiarize themselves with York University's policy on academic honesty, which may also be found on Schulich website:

<http://schulich.yorku.ca/current-students/academic-honesty/> (<http://schulich.yorku.ca/current-students/academic-honesty/>)

Accommodations

For accommodations sought due to exam conflicts, religious reasons, unavoidable absences or disabilities, please refer to the Student Handbook or contact Student Services. For counseling & disability services, contact Student Services or see <http://accessibility.students.yorku.ca/>

(<http://accessibility.students.yorku.ca/>) .

Exams (Absence from)

Midterm

Students who miss a mid-term examination must contact their course instructor within 24 hours and provide the course instructor with documentation substantiating the reason for the absence*. Instructors may request that students submit a copy of their documentation to Student & Enrolment Services. Accommodations and/or re-scheduling of the mid-term exam will be left to the discretion of the course instructor with the expectation that the case be resolved within 14 calendar days.

Final

Within 24 hours of missing a final examination students must contact their course instructor. Students must also submit a completed Deferred Standing Request Form within 48 hours online. Formal documentation* (e.g. Counselor's Statement, death certificate, etc.) regarding the reason for missing the exam must be submitted electronically via file upload as part of the form. The Deferred Standing Request form can be found at <https://schulich.yorku.ca/exam-deferral> (<https://schulich.yorku.ca/exam-deferral>) . Student & Enrolment Services will notify the instructor and copy the student by email if appropriate documentation has been received.

For full details regarding exam deferrals, consult the Undergraduate Academic Handbook (pg.30) and/or the Graduate Policy Handbook (pg. 23).

* Currently, students are not required to submit a doctor's note or an Attending Physician's Statement in support of missed midterms, exams and/or requests for deferred standing for courses impacted by the COVID-19 situation. If you haven't already done so, we strongly encourage you to connect with your course instructor(s) first to make other arrangements to complete outstanding work, as a deferred standing may not be necessary.

Student Rights and Responsibilities

York University is a place of teaching, research, and learning where people value civility, diversity, equity, honesty and respect in their direct and indirect interactions with one another.

The Schulich School of Business strongly supports and adheres to the **Code of Student Rights and Responsibilities** (<https://secure.students.yorku.ca/pdf/CodeofRightsandResponsibilities.pdf>). All students have rights and responsibilities as outlined in this document and are expected to uphold the identified values for the benefit of the entire community.

Violations of community standards are taken seriously and investigated by the Office of Student Community Relations and other appropriate parties (<http://oscr.students.yorku.ca/> (<http://oscr.students.yorku.ca/>)). For details on how to handle a breach of community standards, visit the Office of Student Community Relations website at: <https://oscr.students.yorku.ca/student-conduct> (<https://oscr.students.yorku.ca/student-conduct>). Every student agrees by the act of registration and enrolment to be bound by the regulations and policies of York University and of the Schulich School of Business.

Take time to fully review the Code of Student Rights and Responsibilities:

<https://secure.students.yorku.ca/pdf/CodeofRightsandResponsibilities.pdf> (<https://secure.students.yorku.ca/pdf/CodeofRightsandResponsibilities.pdf>)

*** Please note that academic policies specific to this course may be contained in other parts of this course outline.*



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