

Undergraduate *Certificate in Psychological Methods and Data Analysis*

1. Introduction

1.1 The goal of the undergraduate *Certificate in Psychological Methods and Data Analysis* is to provide students with valuable training in applied quantitative methods and analysis. This Certificate will be housed within the Department of Psychology and falls under the category of a 'Disciplinary Certificate'.

1.2 The name (*Certificate in Psychological Methods and Data Analysis*) is appropriate given the content of the material. There are no other Certificates (that we know of) at York that have a similar name.

2. General Objectives of the Undergraduate Certificate

2.1 The students will gain knowledge in study design, manuscript preparation, basic and advanced statistical methods, basic and advanced research methods, data analysis, psychometrics, the application of statistical methods to real-world problems, modern issues in research methods, statistics and data analysis, and communicating the results of analyses to a variety of audiences. At program completion, students will have developed enhanced reasoning and literacy in research and statistical methods for application in multiple settings. Quantitative skills are in high demand and give behavioral science/health graduates an advantage when competing for entry-level research/data science positions. Further, the Certificate will provide undergraduate students applying to graduate school (in any Psychological area) with an advantage in terms of strong methodological skills.

2.2 The proposed *Certificate in Psychological Methods and Data Analysis* aligns with several University initiatives. For example, this Certificate will help position York as a leader in offering innovative programs and amplify an area of demonstrated strength. York's Psychology Department is already a leader in training graduate students in advanced Quantitative Methods, with the only specialized MA/PhD program in Psychological Methods in Ontario and one of only a few programs in Canada. Further, we also offer a Quantitative Methods Diploma for graduate students not majoring in Quantitative Methods. However, to date, the opportunities available to graduate students have not been available to undergraduate students. The proposed *Certificate in Psychological Methods and Data Analysis* will be the first in Canada to focus on methods and data analysis (Cape Breton University has an Undergraduate Certificate in Quantitative and Qualitative Methods) and will help solidify York's Undergraduate Psychology Program as one of the most innovative and research-focused programs in the country. The proposed *Certificate in Psychological Methods and Data Analysis* also aligns with the academic plans of the Department of Psychology with respect to offering specializations to undergraduate students. For example, this *Certificate* will offer an advanced training opportunity over and above available Concentrations that are being proposed by the Department of Psychology. The proposed *Certificate in Psychological Methods and Data Analysis* also aligns with the Faculty of Health's mission to 'promote a high quality learning experience' and York University's plan to 'reinvent our programs to address emerging issues and labour market needs'. This Certificate will encourage students to take advanced level methods courses which are known to benefit students as they apply to and enter the workforce (see the *Need and Demand* section below).

3. Need and Demand

3.1 To the best of our knowledge, there are no other related Certificates at York. Further, as noted above, this Certificate will also be a one-of-a-kind opportunity within Canada.

3.2 According to the [American Psychological Association](#), job prospects for students with Quantitative Methods skills are excellent and superior to those from other areas of psychology

Although psychology students are famous for fearing methods courses, there are numerous students who have a passion for methods and see the value of becoming more skilled in the application of methods. Further, a [2016 Statistics Canada report](#) found that students specializing in Quantitative Methods earned the highest average salary of any university discipline (tied with Management Sciences). Earning a *Certificate in Psychological Methods and Data Analysis* may be the beginning of a career in Quantitative Methods.

3.3 We expect that 15-20 students from each yearly cohort of Psychology undergraduates will pursue the *Certificate in Psychological Methods and Data Analysis*. The implementation date of the Certificate will be September 2021.

4. Curriculum, Structure and Learning Outcomes

4.1 Students will be required to complete 24 credits in courses related to Psychological Methods and Data Analysis (see Section 4.3).

Learning Outcomes	Alignment with courses
Utilize basic and intermediate methods used to conduct research in Psychology	Students participating in the certificate will be exposed to both introductory and intermediate research methods (i.e., PSYC 2030 and PSYC 3010). In these courses, students are expected to apply the various research methods in Psychology to research scenarios and through the development of a research proposal. Students will learn how to utilize and apply these different methods in PSYC 3015 and PSYC 3090.
Match the research design of a study to the appropriate data analytic approach	Students participating in the certificate will be exposed to both introductory and intermediate statistics (i.e., PSYC 2020 or equivalent, PSYC 3031, PSYC 3032). As part of these courses, students are taught how elements of the design help them to determine an appropriate data analytic approach. Students are then asked to show evidence of their learning through application to various research scenarios or their data analysis assignment(s).
Analyse quantitative data from Psychological studies using basic and intermediate level univariate statistics.	In the introductory and intermediate statistics courses students are taught how to analyze psychological data (i.e., PSYC 2020 or equivalent, PSYC 3031, PSYC 3032). This is reflected in the course topics where students learn ways to explore their data and draw inferences. A more in-depth look at the theories and issues related to analysis of Psychological data is addressed in PSYC 4330.
Use data analytic software to perform basic and intermediate level statistical methods.	In the introductory and intermediate statistics courses students are taught how to analyze psychological data (i.e., PSYC 2020 or equivalent, PSYC 3031, PSYC 3032). This is especially emphasized in the 3000 level courses where students are expected to learn the statistical software R. Note: more instructors at the 2000 level are now incorporating software in their statistics courses to introduce students to how data is analyzed in real-world settings.

Learning Outcomes	Alignment with courses
Interpret and report the results of statistical analyses in APA format	In all of the courses listed in the certificate students are taught how to interpret and report their results in APA format and therefore there is plenty of opportunity and reinforcement.

Students completing the *Certificate in Psychological Methods and Data Analysis* will receive training in basic and intermediate level research methods and statistics. In addition, students also have the opportunity to gain skills in psychological measurement, program evaluation and the theoretical underpinnings of quantitative methods. In other words, the set of courses required for completion of the Certificate build upon the foundational components of research methods and statistics, and completion of these sequentially organized courses will ensure that students are positioned to carry out intermediate level research and conduct, interpret and write-up the results of intermediate level data analysis.

4.2 The methods and criteria for assessing student achievement are established separately for each independent course, with the learning outcomes of the required courses aligned with those of the *Certificate in Psychological Methods and Data Analysis*. That being said, most of the courses will offer a mix of tests and assignments that evaluate the theory underlying the methods discussed (tests) and the practical implementation of the procedures (assignments). For example, in PSYC 3031 (Intermediate Statistics I) students learn both theoretical aspects of statistics (e.g., assumptions, alternative test statistics) as well as the application of the methods (e.g., conducting analyses with statistical software, interpreting and writing up the results). The table presented above provides examples of the kinds of methods used across the courses that make up this Certificate.

4.3 Course requirements of the *Certificate in Psychological Methods and Data Analysis*

The following courses are required:

Unit	Number	Credit Value	Name	Short Description	Existing/New	Equivalent Courses
PSYC	2020	6.00	Statistical Methods I and II	This course provides an introduction to statistical methods for Psychology.	Existing	PSYC 2021 3.00 & PSYC 2022 3.00
PSYC	2030	3.00	Introduction to Research Methods	This course provides an introduction to basic research methods that are used in Psychology.	Existing	
PSYC	3031	3.00	Intermediate Statistics I	This course builds on the topics introduced in PSYC 2020 6.00 and expands the student capabilities with statistical software.	Existing	
PSYC	3032	3.00	Intermediate Statistics II	This course builds on the topics covered in PSYC	New	

Unit	Number	Credit Value	Name	Short Description	Existing/New	Equivalent Courses
				3031 3.00, covering advanced topics related to the analysis of Psychological data.		
PSYC	3090	3.00	Psychological Measurement	This course provides an introduction to the theory and methods of Psychological testing.	Existing	

In addition, six credits are required from the following options:

Unit	Number	Credit Value	Name	Short Description	Existing/New
PSYC	3010	3.00	Intermediate Research Methods	This course builds on the material taught in PSYC 2030 3.00, providing students with a more solid foundation to design, execute, and communicate the findings from Psychological studies.	Existing
PSYC	3015	3.00	Introduction to Program Evaluation	This course introduces the student to the methods involved in collecting, analyzing, and using information to answer questions about psychological programs.	Existing
PSYC	4330	3.00	Seminar in Statistics	This course provides training in advanced level theories and issues related to the analysis of Psychological data.	Existing

Unit	Number	Credit Value	Name	Short Description	Existing/New
PSYC	3900	3.00	Independent Research Project	The topic of the project must directly relate to Psychological Methods and Data Analysis and be approved by the <i>Certificate in Psychological Methods and Data Analysis</i> Coordinator.	Existing
PSYC	3901	3.00	Independent Research Project	The topic of the project must directly relate to Psychological Methods and Data Analysis and be approved by the <i>Certificate in Psychological Methods and Data Analysis</i> Coordinator.	Existing
PSYC	3902	6.00	Independent Research Project	The topic of the project must directly relate to Psychological Methods and Data Analysis and be approved by the <i>Certificate in Psychological Methods and Data Analysis</i> Coordinator.	Existing
PSYC	3903	6.00	Independent Research Project	The topic of the project must directly relate to Psychological Methods and Data Analysis and be approved by the <i>Certificate in Psychological Methods and Data Analysis</i> Coordinator.	Existing
PSYC	4900	3.00	Independent Research Project	The topic of the project must directly relate to Psychological Methods and Data Analysis and be approved by the <i>Certificate in Psychological Methods and Data Analysis</i> Coordinator.	Existing

Unit	Number	Credit Value	Name	Short Description	Existing/New
PSYC	4901	3.00	Independent Research Project	The topic of the project must directly relate to Psychological Methods and Data Analysis and be approved by the <i>Certificate in Psychological Methods and Data Analysis</i> Coordinator.	Existing
PSYC	4902	6.00	Independent Research Project	The topic of the project must directly relate to Psychological Methods and Data Analysis and be approved by the <i>Certificate in Psychological Methods and Data Analysis</i> Coordinator.	Existing
PSYC	4903	6.00	Independent Research Project	The topic of the project must directly relate to Psychological Methods and Data Analysis and be approved by the <i>Certificate in Psychological Methods and Data Analysis</i> Coordinator.	Existing

The required courses (PSYC 2020, PSYC 2030, PSYC 3031, PSYC 3032, PSYC 3090) and PSYC 3010 are all expected to be offered yearly. PSYC 3015 and PSYC 4330 are expected to be offered every two years.

The minimum average GPA across all courses counting towards the Certificate is a C+.

Note 1: Although normally Certificates require students to take at least 18 credits at the 3000 level or above, for this Certificate only 15 credits are required at the 3000 level or above. Much of the foundation for the Certificate is taken at the 2000 level (e.g., PSYC 2020 (or PSYC 2021/PSYC 2022), PSYC 2030), with 3000/4000 level courses building on specific aspects of that foundation. In other words, without offering/requiring the foundational nine credits at 2000 level, the content in the 3000/4000 level courses would be difficult to process. Thus, we believe that requiring nine credits at the 2000 level and 15 credits at the 3000/4000 level is justified and provides students with a good balance of foundation and more specialized skills.

Note 2: Students in the Specialized Honours Program are required to take PSYC 2020 6.00 (or PSYC 2021 3.00/PSYC 2022 3.00), PSYC 2030 3.00, PSYC 3031 3.00, and PSYC 3010 3.00 as part of their degree requirements. Thus, in order to ensure that they have taken at least 12 credits beyond what is required by their program, they cannot use PSYC 3010 3.00 to satisfy the six credits required from the course options available. However, they can take any two of PSYC 3015 3.00, PSYC 4330, 3.00 PSYC 390x 3.00, and PSYC 490x 3.00 or PSYC 390x/490x 6.00 to satisfy this requirement.

4.4 Courses will be offered face-to-face, online, or blended (partially face-to-face, partially online). Much of the material related to research methods and statistics can be taught effectively online, however face-to-face instruction, especially for examples of how to apply the methods/analysis, is beneficial for many students. In each of the courses offered with this certificate students are required to balance the conceptual and the practical. For the conceptual component of these courses offering students the opportunity to have this information prior to the normal class time is beneficial as it frees up the actual class time for addressing questions, reinforcing and applying concepts, and building skills. In all of the learning outcomes presented under this certificate students are expected to be able to utilize, match, analyse, interpret, or report information

in some form. Trying to balance the conceptual and practical all during normal class time can be overwhelming for students and therefore these proposed modes of delivery will allow for some flexibility in providing students with enough time and support to acquire the learning outcomes.

5. Admission Requirements

5.1 Students pursuing the *Certificate in Psychological Methods and Data Analysis* will need to be registered in an undergraduate degree program within the Department of Psychology, and complete the requirements listed above. This is appropriate given that the *Certificate in Psychological Methods and Data Analysis* is targeted at undergraduate Psychology students.

6. Resources

Following completion of the required courses, students will complete a Certificate Application which will be administered by the Department of Psychology.

6.1 Faculty resources: As indicated above, the Department of Psychology is already home to one of the only Quantitative Methods for Psychology graduate programs in Canada, and hence we already have several faculty members with specializations in Quantitative Methods. Further, the Department of Psychology has several teaching stream faculty with specializations in Quantitative Methods. The table below lists faculty with specializations in Quantitative Methods. There are also several other faculty members who are qualified to teach undergraduate research methods and statistics courses.

Faculty Member	Academic Level	Stream
Maxwell Barranti	Assistant Professor	Teaching
Philip Chalmers	Assistant Professor	Research
Ji Yeh Choi	Assistant Professor	Research
Robert Cribbie	Professor	Research
David Flora	Professor	Research
Christopher Green	Professor	Research
Monique Herbert	Assistant Professor	Teaching
Alistair Mapp	Assistant Professor	Teaching
Jodi Martin	Assistant Professor	Teaching

All of these faculty members currently teach, or will be teaching, methods courses at the Undergraduate level within the Department of Psychology. Further, the Department of Psychology is hiring a new Quantitative Methods faculty member to start July 1, 2021 and this individual will be expected to teach methods and analysis courses at the undergraduate level.

6.2 Laboratory facilities: No labs or major equipment are required for carrying out these courses (and hence the *Certificate in Psychological Methods and Data Analysis*). The Department of Psychology now uses open source software (e.g., R) in all methods/analysis courses. Thus, labs are now carried out within the designated classroom or online.

6.3 Space: No additional space will be required in order to carry out the *Certificate in Psychological Methods and Data Analysis* given the statistical software options chosen (see 6.2).

7. Support Statements

- from the relevant Dean(s)/Principal, with respect to the adequacy of existing human (administrative and faculty), physical and financial resources necessary to support the undergraduate certificate, as well as the

commitment to any plans for new/additional resources necessary to implement and/or sustain the undergraduate certificate ○ Submitted

- from the University Librarian confirming the adequacy of library holdings and support ○ Submitted
- from the University Registrar confirming the implementation schedule and any administrative arrangements
 - Submitted

8. Calendar Copy

Disciplinary Certificate in Psychological Methods and Data Analysis

Admission: Students enrolled in an undergraduate degree program within the Department of Psychology in the Faculty of Health. Students can begin working on the requirements for the Certificate at any time, with an application to receive the Certificate submitted after successful completion of all the requirements (see below).

Graduating with a Certificate: A grade point average of 5.00 (C+) or greater is necessary in each of the courses taken to satisfy the requirements of the Certificate. Students must submit an application to graduate with the Certificate. Applications can be obtained from, and are submitted to, the Department of Psychology. Transcript notation that the requirements for the Certificate have been completed will be made once the Registrar's Office has received notice from the Department of Psychology of successful completion of the Certificate requirements. Certificates will not be conferred until candidates have successfully completed an undergraduate degree program.

Required courses (18 credits):

HH/PSYC 2020 6.00 **or** PSYC 2021 3.00 and PSYC 2022 3.00
HH/PSYC 2030 3.00
HH/PSYC 3031 3.00
HH/PSYC 3032 3.00
HH/PSYC 3090 3.00

A minimum of 6 credits selected from the following courses (see requirements above):

HH/PSYC 3010 3.00
HH/PSYC 3015 3.00
HH/PSYC 3900 3.00
HH/PSYC 3901 3.00
HH/PSYC 3902 6.00
HH/PSYC 3903 6.00
HH/PSYC 4330 3.00
HH/PSYC 4900 3.00
HH/PSYC 4901 3.00
HH/PSYC 4902 6.00
HH/PSYC 4903 6.00

November 24, 2020

**FACULTY OF
HEALTH**

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Dear Colleagues,

It is a pleasure to provide this letter of support for the Department of Psychology's proposal to introduce a Certificate in Psychological Methods and Data Analysis. As noted by my colleagues, there is a growing demand for graduates with advanced skills in research design, statistics and data analysis. Recent surveys suggest that students with these skills have higher rates of employment across a wide variety of health and social service areas, in the public, non-profit and private sectors. Since the skills being developed are highly applicable to a number of fields across the social and health sciences, the certificate will also provide an important benefit for those seeking admission to various graduate programs within and well beyond psychology. The use of open source software and labs will enhance student hands on experience. The proposed certificate will provide an important way for our students to convey their expertise in how to design, analyze and disseminate research in applied settings. They will also develop advanced skills in psychometrics (the construction and analysis of instruments to assess human characteristics, interests, conditions and traits). As such, the proposed Certificate is a wonderful example of the Department of Psychology's efforts to contribute to the UAP, and priority 1 (21st century knowledge) in particular.

Because the Certificate will simply bundle a group of existing courses, it will enable students to develop and convey to others a concertation of desirable 21st century knowledge and skills in a manner which does not require any significant new resources, space or teaching capacity.

Sincerely,



Paul McDonald, PhD, FRSPH, FCAHS
Professor and Dean



MEMORANDUM

York University Libraries

SUBJECT: Library Statement for the Undergraduate Certificate in
Quantitative Methods for Psychology

FROM: Maura Matesic
Social Science and Communication Studies Librarian

DATE: August 2020

Undergraduate Certificate in Quantitative Methods for Psychology

York University Libraries will be able to support the Undergraduate certificate in Quantitative Methods for Psychology.

This certificate program will allow students the opportunity to gain knowledge and experience in study design, manuscript preparation, statistical methods, research methods and data analysis among other topics. Students will develop real world skills for multiple settings including a variety of work placements and graduate study programs.

York University Libraries currently maintains a very good collection in the areas of sociology, psychology, and social science, as a number of subject specialist librarians contribute to the collections in these areas. The York University Libraries in-house collection of materials may be complemented by the Libraries online databases: CSA Sociological Abstracts, PsychInfo, Lexis Nexis Academic, JStor, Web of Science, Expanded Academic, and Social Sciences Abstracts.

I have reviewed the course bibliography and materials not currently in the collection will be added. As well, the instructor(s) may wish to place material on reserve in the Scott Library.

For additional student support, the instructor may also wish to consider a component of Information Literacy instruction to teach research strategies at the appropriate level.



September 28, 2020

DIVISION OF STUDENTS

**Office of the University
Registrar**

Darran A. Fernandez
University Registrar

Bennett Centre for Student
Services
4700 KEELE ST.
TORONTO ON
CANADA M3J 1P3
T 416 736 2100
roinfo@yorku.ca

To: Academic Standards, Curriculum and Pedagogy Committee

RE: Support letter Undergraduate *Certificate in Quantitative Methods for Psychology*

The proposal for the creation of a new Undergraduate Certificate in Quantitative Methods for Psychology has been reviewed by the Office of the University Registrar (OUR).

As certificates are audited by departments we look forward to collaborating with the Department of Psychology to work through any remaining implementation details in support of their requirements.

We support the establishment of the undergraduate certificate.

Sincerely,

A handwritten signature in cursive script that reads "Darran Fernandez".

Darran A. Fernandez, M.Ed.
University Registrar
York University



School/Department: PSYCHOLOGY

Course Rubric and Number: PSYC 3032

Credit Weight: 3.00 **Effective Session:** Fall 2021

Course Title: *The official name of the course as it will appear in the Undergraduate Calendar.*

INTERMEDIATE STATISTICS II

Short Title: *Maximum 40 characters, including punctuation and spaces. The short title appears on any documents where space is limited (transcripts and calendar copy).*

INTERMEDIATE STATISTICS II

Brief Course Description: *For editorial consistency, verbs should be in the present tense and begin the description; e.g., "Analyzes the nature and extent of..."*

This is the official description of the course as it will appear in the Undergraduate Calendar. The course description should be carefully written to convey what the course is about. If applicable, include information regarding the language of instruction if other than English.

Topics include data preparation and visualization, analyses with missing data, intermediate general linear models, robust statistics, and communicating statistical results. In addition, the students will also be trained in statistical software (e.g., R) for analyzing data.

List course(s) where applicable:

Prerequisites: HH/PSYC 1010 6.00 with minimum grade of C, HH/PSYC 2020 6.00 or equivalent (e.g, HH/PSYC 2021 3.00 and HH/PSYC 2022 3.00), HH/PSYC 2030 3.00, HH/PSYC 3031 3.00

Corequisites:

Cross-listed to:

Course Credit Exclusions*:

Integration:**

*Course credit exclusion is a formal status accorded to pairs of courses that are recognized as having sufficient overlap in content to warrant specifically excluding students from obtaining credit for both.

**Integrated courses are graduate courses integrated (taught with) 4000-level undergraduate courses

Include the following information only if the course is: limited to a specific group of students; closed to a specific group of students; and if there is any additional information necessary for students to know before enrolling (notes section). If the course includes experiential education, such as whether the students will work with a community partner and/or if it will involve going off-campus, please include this in the notes section.

Open to: All students meeting the prerequisites and who have completed a minimum of 54.0 credits, or by permission from the Department of Psychology

Not open to:

Notes:

Science Course:

Denotes courses in IHST, KINE or PSYC to count as science credit for BSc degree programs

YES	NO
<input checked="" type="checkbox"/>	<input type="checkbox"/>

Section A - Course Rationale:

1. What is the rationale for creating this course (e.g., fills a gap in the curriculum, addresses a trend in the content area)?

Several years ago, PSYC 3030 6.0 (Intermediate Statistics) stopped being offered and PSYC 3031 3.0 (Intermediate Statistics I) started being offered and was required of specialized honours students. This course fills the gap that was left when PSYC 3030 stopped being offered. Together, PSYC 3031/3032 will better prepare students for jobs requiring quantitative skills, graduate programs, etc.

2. Describe how this new course aligns with the School/Dept and/or Faculty and/or University Academic Plans. For more information about these plans, contact your UPD, Department Chair, and/or the Associate Dean, Learning, Teaching, & Academic Programs.

One of the goals of the Psychology department is that undergraduate students leave with a sound understanding and application of quantitative methods and analysis. This course offers students the opportunity to develop tangible statistical and data analysis skills that are needed beyond their undergraduate degree (e.g., grad school, research/data analyst) through instruction and in-class experiential experience.

3. How does this proposed course complement, align, or overlap with existing course offerings, particularly in terms of objectives and/or content? If overlap exists, please indicate the nature and extent of consultation which has taken place. If the course is to be cross-listed, integrated or listed as a course credit exclusion with another course, approval is required from all the relevant Faculties/units.

This course does not overlap with any existing course offerings. This course covers more advanced topics than PSYC 3031 - Intermediate Statistics I (PSYC 3031 is a prerequisite for PSYC 3032).

4. What is the expected enrolment in the course? If course enrollments are below 50 please explain why.

50 students

Section B - Course Structure:

1. Is this course (Please select one):

Fully online

Fully face to face

Blended (i.e., one third of the face to face class time is replaced by online instruction, one third of the class time remains face to face, and the remaining third may be any combination of online and face to face delivery). More information about defining blended learning can be found in the [Common Language for eLearning \[PDF\]](#).

Other (please describe below)

2. Number of contact hours (defined in terms of hours, weeks, etc.) involved. This information is particularly important to describe for blended and online courses as it indicates whether an effective length of term is being maintained.

Flipped classroom: Approximately 2/3 (4 hours/week) of the student's learning time will be online and 1/3 (2 hours/week) will be in class. Two hours per week of face-to-face to field questions and teach applied skills, with remaining time completed online (this includes online activities such as readings, video lectures, quizzes, interactive tutorials, etc).

3. a) If this course is offered in a blended format, what percentage of the course will be taught online? If not blended, go to #4.

b) In absence of scheduled contact hours (face-to-face or online), please provide an indication of the estimated time students are likely to spend engaged in learning activities online required by the course.

c) In the absence of scheduled contact hours (face-to-face or online), please describe how the course design encourages student engagement and supports students in achieving the learning outcomes.

2/3 will be online and 1/3 will be face-to-face

4. Indicate the planned frequency of offering and number of sections anticipated (every year, alternate years, etc.)

1 section per year

5. Can you staff this course using current teaching capacity?

YES

If no, explain how this course will be resourced (e.g., additional hires proposed in hiring plan. etc.)

6. Please name the faculty members(s) in the school/department who have the expertise and are willing to teach this course.

At least 8 faculty members are competent to teach this course. In the upcoming years the following faculty are likely to teach this course:

Rob Cribbie, Monique Herbert, Philip Chalmers, Jodi Martin, Al Mapp, Ji Yeh Choi, David Flora

7. Does the course rely on faculty from other programs to teach this course? If so, specify (proposed instructor(s) name and department and attach a letter of support from the faculty members home school/department UPD/Chair.

NO

Section C - Course Design Information:

This section provides an opportunity to describe the course, its design, and how delivery of the course content aligns with the learning outcomes, teaching activities, and assessment methods. There is also an opportunity for describing how the course applies principles of experiential education, technology enhanced learning and universal design for learning.

- **Experiential Education** remains a top priority for York University and the Faculty of Health as it offers a range of benefits for students related to academic performance, civic engagement and employability. Note that providing and facilitating opportunities for structured, critical reflection (e.g. using iclicker/REEF polling, exit cards, journal entry) is a key component of experiential education. Course directors are invited to integrate EE into their course where possible, but it is understood that some EE activities may not be feasible in every course. Visit the [Health website](#) to see definitions of course focused, community focused, and work focused EE, information on the benefits of EE for students and course directors, and other details.
- The integration of tools and strategies for [technology enhanced learning](#) (e.g. online learning management system like Moodle, use of polling technology such as iclicker/REEF and other in class technology e.g., may provide useful tools for encouraging in class engagement and facilitating deeper learning. For help with online and blended learning course development, visit [Learning Technology Services](#).
- The Faculty of Health is committed to the **universal design for learning** principles, i.e., offering and ensuring a diverse array of opportunities for all learners to engage, learn, and demonstrate their knowledge. More information about Universal Design for Learning, as well as recommendations for accommodations and inclusive teaching, can be found at [UDL Guidelines \[PDF\]](#), and on the Teaching Commons website. Therefore, when designing a course, be sure to consider
 - multiple means of engagement (How will diverse students access and participate in the learning & teaching activities?)
 - multiple means of representation (How will course content be presented in a variety of different ways to support different learning needs and preferences?)
 - multiple means of action & expression (What diverse ways will students be able to demonstrate their

learning?)

1. Course Topics/Theories

List the key topic areas taught in this course.

Data Cleaning and Preparation
Analyses with Missing Data
Data Visualization
General Linear Model (ANOVA, Regression)
Robust Statistics
Categorical Data Analysis
Data Analysis with R
Reporting Statistical Results

Will the course have substantial Indigenous (Aboriginal)* content?

NO

Will the course include Indigenous (Aboriginal)* identity as either a module or field of study?

NO

Will the course include component(s) from Aboriginal Peoples' language, history, cultural, heritage, artefacts, or traditional knowledge?

NO

*The Constitution Act, 1982, section 35(2) defines Aboriginal Peoples to include all Indigenous people of Canada - Indians (Status, Non-Status or First Nations identified), Métis and Inuit people.

If you answered Yes to at least one of the questions above, provide a summary and/or list of the Indigenous (Aboriginal)* content or components you are proposing to include in your course.

Course Teaching Objectives

Course teaching objectives are broad goals for the course.

Examples of course teaching objectives:

- Exposes students to the various methods used for investigating the structure and function of the human brain.
- Provides students the opportunity to develop and practice skills in effective communication.

List the teaching objectives for the course below:

1. Exposes students to different types of research designs in psychology.
2. Provides students the opportunity to analyse psychological data from different research designs using basic and intermediate-level statistics.
3. Exposes students to the use of data analytic software for analysis of psychological data.
4. Provides students the opportunity to think critically about applications of psychological findings.
5. Provides students the opportunity to interpret and communicate results effectively.

3. Course Student Learning Outcomes:

Learning outcomes provide a framework for assessment by stating what the learners will be able to demonstrate after completing the course. A succinct learning outcome specifies the tasks students are expected to be able to perform and the level of competence expected for the tasks. Course Learning Outcomes are observable, measurable goals for students and their learning.

Examples of course learning outcomes:

- Students will be able to correctly identify the brain's major components and gross functional areas.
- Students will be able to accurately describe the factors that impact healthy aging.
- Students will be able to critically analyze an academic journal article to determine the merits and drawbacks of the published research.

To help describe learning outcomes, consider the key questions below:

What essential knowledge, skills, and attitudes etc. should students acquire?

- How sophisticated or complex (memorization, analysis, creation, etc.) is students learning to be?
- What will students be able to do or how will they demonstrate/articulate their level of learning?
- What information is needed to be collected to verify/demonstrate students' attainment of learning outcomes?
- How informative are each of these assessment tasks to understanding the student learning process?
- Are these clearly stated and communicated to students?

More information and additional resources can be found on the [Teaching Commons website](#).

List and number the learning outcomes for the course in the section below:

1. Students will be able to define hypotheses and distinguish between types of variables (predictors, outcomes, mediators, moderators, etc.).
2. Students will be able to identify and conduct the appropriate analysis(es) for intermediate level research question(s)/hypothesis(es), including multiple predictor models, moderation, and mediation.
3. Students will be able to compare/contrast the distinct roles of hypothesis testing, effect sizes and confidence intervals.
4. Students will be able to describe the limitations of the statistical analyses chosen.
5. Students will be able to conduct and interpret the appropriate data analysis using statistical software.
6. Students will be able to interpret and communicate their results in APA format.

4. Course Teaching Strategies and Learning Activities

1. What teaching strategies and learning activities (including experiential education) will take place as part of this course? What will students be doing each week in class? How will these activities help support students' learning as defined by the learning outcomes.

To help identify course learning activities that will help students work toward achieving intended learning outcomes, reflect on these key questions:

- How will students receive or gain the information necessary for achieving the course intended learning outcomes?
- What experiential education activities will students engage in?
- What opportunities will or could students be provided to practice the skills they will develop?
- How and when will students engage with each other, with the instructor, and/or with course content?
- If technology-enhanced learning is incorporated into the course, what activities will the students engage in?

Examples:

(This is not an exhaustive list, but rather a summary of the strategies an instructor may use to encourage and facilitate meaningful learning throughout the course)

- In class discussions
- Lecture
- Online discussion forums (e.g. in Moodle)
- Active learning strategies (e.g. think, pair, share; structured debates)
- Wikis (contribute to and curate collaborative content)
- Experiential Education (EE)- Classroom Focused Activities (e.g. guest speakers, role playing, visual media, case studies, simulations, workshops and laboratory, course-based research, etc.)
- EE- Community Focused EE Activities (e.g. community-based learning; community-based research, community service learning)
- EE- Work Focused Activities (e.g. placement/practicum)

List the teaching strategies and learning activities that will be included in this course:

In class discussions, lectures (in-person, online), exercises/assignments, online discussion forums (Moodle), active learning strategies (e.g., completing analyses with feedback), experiential education (EE) (e.g., course-based research, analysis of real data).

Section D - Course Mapping and Constructive Alignment

This section is designed to help you demonstrate the connections between your learning outcomes, teaching and learning activities, and assessment strategies. For each teaching and learning activity, please i) identify the learning outcome it will help the students achieve and ii) if the activity will include a formal, graded assessment of student learning. For EE activities, also identify iii) how you will engage students in reflection around the activity (i.e. critically examining the experience), and iv) the type of EE strategy the activity corresponds to.

For EE Activities Only

Teaching and Learning Activity	Which course learning outcome/s will this activity help student achieve?	Will this activity include a formal, graded assessment of student learning? (Y/N) <i>A detailed description of assessment and evaluation strategies will be provided in the next section.</i>	How you will engage students in reflection around this activity?	Corresponding EE Strategy 1- Classroom Focused 2- Community Focused 3- Work Focused
<i>Example:</i> 1. Guest Speaker representing a community-focused agency	<i>Example: Identify and critically evaluate challenges to implementing equity-informed health policies</i> OR <i>Learning Outcome #3</i>	<i>Example:</i> N	<i>Example: Think-Pair-Share- In pairs, students will discuss two key questions, and share responses with the class.</i>	1
Assignments	Learning outcomes 1 to 6	Y	Students will complete multiple assignments during the course. In order to complete the assignments, students will need to review and reflect on the course content and how it applies to their assignment.	

Teaching and Learning Activity	Which course learning outcome/s will this activity help student achieve?	Will this activity include a formal, graded assessment of student learning? (Y/N) <i>A detailed description of assessment and evaluation strategies will be provided in the next section.</i>	How you will engage students in reflection around this activity?	Corresponding EE Strategy 1- Classroom Focused 2- Community Focused 3- Work Focused
Lectures	Learning outcomes 1 to 6	Y	Lectures will be conducted online (e.g., videos) and in-class (include checks on learning, e.g., iClicker/ REEF quizzes).	
Tests	Learning outcomes 1 to 5	Y	Tests will cover all aspects of the material to be learned, including questions relating to the interpretation of software output.	
Online Activities	Learning outcomes 1 to 5	Y	Online activities will be completed to support and reinforce traditional learning. Types of activities include programming examples, video demonstrations, quizzes, etc.	

1. If the course will not include any type of experiential education, please comment below on the rationale for not incorporating experiential education into the course.

N/A

2. Will the course engage Indigenous (Aboriginal) communities (including reserves, territories, departments, or community organizations, etc) on experiential education?

NO

Learning/Teaching with Technology:

3. How are learning or teaching technologies incorporated into the course?

Moodle/eClass will be used in the course for students to access all class materials and for communicating with instructors and fellow students.

4. If the course does not include any type of technology enhanced learning, please comment below on the rationale for not

incorporating learning or teaching technologies in the course.

N/A

5. If the proposed course employs technology-enhanced forms of delivery (e.g., replacing in-class time with online learning activities), please identify how the integrity of the learning evaluation will be maintained (e.g., using online quizzes that randomly selects questions from a test-bank; specified time length of the test, "on-site" examinations will be required, etc.)

On-site examinations will be required.

Assessment and Evaluation Strategies

1. How will student learning be assessed? Please list each graded component of the proposed course including the type and percentage value of each component. Indicate which learning outcome(s) are evaluated by which assessment component.

Assessment Strategy	Percentage (%) of Final Grade	Evaluated Learning Outcome(s)
Example: Final Exam	40%	1, 2
Example: In Class Quizzes	4/10% each	1
Example: Teaching & Learning Activity #1 (Reflection) (1%)	1%	3
Test #1	20%	1 to 5
Test #2	20%	1 to 5
Assignment #1	15%	1 to 6
Assignment #2	15%	1 to 6
Online Quizzes	10%	1 to 5
Applied Analysis Project	15%	2, 4 to 6
Applied Analysis Presentation	5%	2, 4 to 6

2. Formative feedback is just in time feedback to the students during the course that does not count toward the final grade. This formative feedback can help the students and instructor progress towards the intended learning outcomes by providing ongoing, low stakes feedback at key points in a lesson or at milestones toward completing a major assignment.

Some examples of formative feedback include:

- a pre-test or quiz that asks students to share what they already know about a topic
- a think-pair-share exercise where students explore and discuss key course concepts individually, in pairs, and as part of a larger in class discussion
- exit cards following a lecture or lesson where students are asked to indicate what they have learned and questions they still have about the topic

List the formative assessment strategies that will be used in this course below.

During class time, students are given in-class activities with the sole purpose of allowing them to engage with the concepts taught on a given day in groups. As students work on their activities, the TA and instructor move around to engage students and offer feedback. Feedback is also provided to the larger group so that all students benefit.

3. If the course is to be integrated (i.e., graduate/undergraduate), please list the additional evaluation requirements for graduate students.

N/A

Bibliography:

4. Please list the required readings for the course (include ebooks, online readings, and open access resources). The reading list must contain complete bibliographical information (full name of author, title, year of publication, etc.).

Navarro, Danielle (2020). [Learning statistics with R: A tutorial for psychology students and other beginners \(Version 0.6\) \[PDF\]](#).

5. Please list any suggested readings for the course (include ebook, online readings, and open access resources). The reading list must contain complete bibliographical information (full name of author, title, year of publication, etc.)

Text (Online and Hard copy)

[Wickham's and Grolemund's R for Data Science](#)

[R Graphics Cookbook](#)

Steve Nydick's Introduction to R for Psychologists

APA (2016). Publication manual of the American Psychological Association. Washington, DC: American Psychological Association.

Nicol, A. A. M., & Pexman, P. M. (2010). Presenting your findings: A practical guide for creating tables. Washington, DC: American Psychological Association.

Osborne, J. W. (2012). Best practices in data cleaning. Los Angeles, CA: Sage Publications Inc.

Online Resources

[RTips](#)

[R Cheatsheets](#)

[Choosing appropriate plots and example R code](#)

[Quick R](#)

[R bootcamp](#)

[Searching for R help made easy](#)

[Visualization and analyses with ggstatplot](#)

6. If the course is to be integrated (graduate/undergraduate), a list of the additional readings required of graduate students must be included. If no additional readings are required, a rationale should be provided.

N/A

Section E - Resources Requirements:

This section may need to be filled in with the help of your Chair/Manager and operations manager:

1. Computing:

- Indicate the expected hardware, software and need for student access to computing labs, including the number of student access hours needed (e.g. access to teaching computer lab with SPSS installed; students required to bring their own device). Provide cost of software, where possible. Indicate, what the cost will be for the students, if any?

N/A. All software used in the course will be open source and students will complete exercises, etc. using their own computers.

2. Classroom:

- Indicate the expected specialized classroom needs (e.g. moveable table and chairs; audio/visual equipment; WIFI to support students with bringing their own device)

No specialized needs are required, just desks, A/V equipment, and WIFI.

3. Teaching Support:

- Does the course require technical support? (e.g. lab technician; UIT support).
- Does the course require a tutorial or lab in addition to lecture/seminar hours?
- Does the course require marker/grader, teaching assistant, lab demonstrator etc. support above those normally allocated by the department/school offering the courses?
- If the course includes off campus practicums/placements or field experiences, such as students working with a community partner, indicate:
 - Will the instructor need to travel to visit the off-campus community partner(s)?
 - o Will the experiential Education Coordinator be required to support and maintain the experiential education component while the course is being offered?
 - o Is the placement intended to be domestic or international, or both?
- If the course is blended or online, indicate whether the support of the eLearning specialist is required?

Faculty of Health
Department of Psychology
PSYC 3032 3.0: INTERMEDIATE STATISTICS II

Course Prerequisite(s): Course prerequisites are strictly enforced

- HH/PSYC 1010 6.0 (Introduction to Psychology), with a minimum grade of C.
- HH/PSYC 2020 6.0 (Statistical Methods I and II) or substitute (e.g., HH/PSYC 2021 3.0 & HH/PSYC 2022 3.0)
- HH/PSYC 2030 3.0 (Introduction to Research Methods)
- HH/PSYC 3031 3.0 (Intermediate Statistics I)
- Completed at least 54 earned credits

Course Credit Exclusions

Please refer to [York Courses Website](#) for a listing of any course credit exclusions.

Course Description

This course provides students with the opportunity to apply, consolidate, and extend their statistical analysis skills to realistic psychological data for independent groups designs, repeated measures designs and correlational designs. Effect sizes and hypothesis testing will be covered for all types of hypotheses, including mean differences, interactions among discrete and/or continuous variables, correlation/regression, multiple regression, etc. An important component of the course is the use of the statistical software package R for all analyses.

Course Format

This course will be delivered in a blended format, namely a combination of in-class and online learning. Online materials, activities, etc. will be available to students throughout the course, while in-class time will be reduced and will be used to support and reinforce learning, demonstrate the material through examples and exercises, etc.

Course Learning Outcomes

- Students will be able to define hypotheses, and distinguish between types of variables (predictors, outcomes, mediators, moderators, etc.).
- Students will be able to identify and conduct the appropriate analysis(es) for intermediate level research question(s)/hypothesis(es), including multiple predictor models, moderation, and mediation.
- Students will be able to compare/contrast the distinct roles of hypothesis testing, effect sizes and confidence intervals.
- Students will be able to describe the limitations of the statistical analyses chosen.
- Students will be able to conduct and interpret the appropriate data analysis using statistical software.
- Students will be able to interpret and communicate their results in APA format.

Specific Learning Objectives

- Expose students to different types of research designs in psychology
- Explain and critique existing methodologies
- Provide students the opportunity to analyse psychological data using intermediate-level statistics (i.e., methods beyond those learned in previous courses, but not at the level of a graduate course)
- Expose students to the use of data analytic software for analysis of psychological data
- Provide students the opportunity to think critically about applications of psychological findings
- Provide students the opportunity to interpret and communicate results effectively

Potential Textbooks (Online and Hard copy)

Foster et al. (2018) –

[An Introduction to Psychological Statistics](#)

Navarro, D. J. (2016). [Learning statistics with R: A tutorial for psychology students and other beginners \(Version 0.6\)](#).

Online Resources

[Wickham's and Golemund's R for Data Science](#)

[R Graphics Cookbook](#)

Steve Nydick's [Introduction to R for Psychologists](#)

APA (2016). *Publication manual of the American Psychological Association*. Washington, DC: American Psychological Association.

Nicol, A. A. M., & Pexman, P. M. (2010). *Presenting your findings: A practical guide for creating tables*. Washington, DC: American Psychological Association.

Osborne, J. W. (2012). *Best practices in data cleaning*. Los Angeles, CA: Sage Publications Inc.

[RStudio Cloud Primers](#)

[RTips](#)

[R Cheatsheets](#)

[Choosing appropriate plots and example R code](#)

[sQuick R](#)

[R bootcamp](#)

[Searching for R help made easy](#)

Course Requirements and Assessment:

Assessment	Weighting
Assignments	2 x 15%
Tests	2 x 20%
Online Quizzes	10%
Applied Analysis Project	15%
Applied Analysis Presentation	5%
Total	100%

Assignments: The assignments will provide students with the opportunity to apply the statistical concepts to realistic psychological data. Students will use statistical software to manage, explore and analyse their data. Students will also interpret and report the findings of their analyses in APA format. It is expected that you complete these activities individually.

Tests: The tests will evaluate learning of the theoretical and practical aspects of the course. For example, in what situations to apply specific approaches, what issues may affect the validity of the analyses conducted, what alternative approaches are available when there are issues with the data (e.g., assumption violation, missing data).

Online Quizzes: Online quizzes will be used to monitor learning in between tests and ensure that students are staying on top of weekly readings and exercises.

Applied Analysis Project/Presentation: For this project, students will use real data and will analyze the data using methods learned in the class. Tasks will include developing hypotheses, checkings for issues/assumptions with the data, running appropriate analyses, and writing a summary of the results. Students will present their projects during the last two weeks of class.

Grading as per Senate Policy

The grading scheme for the course conforms to the 9-point grading system used in undergraduate programs at York (e.g., A+ = 9, A = 8, B+ = 7, C+ = 5, etc.).

For a full description of York grading system see the York University Undergraduate Calendar - [Grading Scheme for 2020-21](#)

Course Schedule

Week	Topic
1	<i>Course Introduction</i> <i>Introduction to R and RStudio</i>
2	<i>Review of Descriptive and Basic Inferential Statistics</i>
3	<i>Factorial Independent Groups Designs I</i>
4	<i>Factorial Independent Groups Designs II</i>
5	<i>Factorial Repeated Measures and Mixed Designs</i>
6	<i>Test 1</i> <i>Introduction/Review of Single and Multiple Continuous Predictor Models</i>
7	<i>Multiple Continuous Predictor Models: Assumptions and Alternatives</i>
8	<i>Models with Discrete and Continuous Predictors</i>
9	<i>Multiple Predictor Models: Mediation/Moderation</i>
10	<i>Chi-square Goodness of Fit/Independence</i>
11	<i>Presentations</i>
12	<i>Test 2</i>

MEMORANDUM

York University Libraries

SUBJECT: Library Statement for the Intermediate Statistics II (Psychology)

FROM: Maura Matesic
Social Science and Communication Studies Librarian

DATE: October 2020

Intermediate Statistics II (Psychology)

York University Libraries will be able to support the course Intermediate Statistics in Psychology.

This course will allow students the opportunity to gain knowledge and experience in a variety of statistical concepts including data preparation and visualization, intermediate general linear models, and robust statistics among others. Additional instruction will be offered in the statistical software (R) for analyzing data.

York University Libraries currently maintains a very good collection in the areas of math, science, psychology, and social science, as a number of subject specialist librarians contribute to the collections in these areas. The York University Libraries in-house collection of materials may be complemented by the Libraries online databases: CSA Sociological Abstracts, PsychInfo, Lexis Nexis Academic, JStor, Web of Science, Expanded Academic, and Social Sciences Abstracts.

I have reviewed the course bibliography and most of the materials appear to be offered online. Any additional materials not currently in the collection will be added. As well, the instructor(s) may wish to place material on reserve in the Scott Library.



January 27, 2021

To the Committee,

UNIVERSITY
INFORMATION
TECHNOLOGY

Learning Technology
Services

4700 KEELE ST.
TORONTO ON
CANADA M3J 1P3
T 416 736 2100
EXT 30341
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rfinlays@yorku.ca
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University Information Technology (UIT) is committed to the support of eLearning for the academic community and supports many technologies that underpin those efforts, include eClass as York's primary learning management system. Within eClass a wide array of tools are made available to support pedagogical needs for information delivery, communications between course participants, assessment, collaboration and others. Additionally, within UIT Learning Technology Services (LTS) provides primary support to courses and instructors within the Faculty of Health.

Support for the course requirements including delivery of course components through eClass video lectures, wikis for content collaboration, and discussion forums as well as quizzing through iClicker are included with our standard support of learning technologies. With these supports in place I'm happy to confirm UIT support of "*Intermediate Statistics II.*"

I wish you well on your proposal for this course.

Sincerely,

Rob Finlayson

Rob Finlayson

Manager, Learning Technology Services
University Information Technology

