UNIVERSITY of GUELPH

COLLEGE of SOCIAL AND APPLIED HUMAN SCIENCES

DEPARTMENT OF FAMILY RELATIONS AND APPLIED NUTRITION

FRAN*6010 Applied Statistics

COURSE OUTLINE – FALL 2021

1. GRADUATE CALENDAR DESCRIPTION

Students will learn conceptual and practical applications of statistical analyses with emphasis on hypothesis formation, data screening, test selection, inferential statistics, univariate and multivariate analysis of variance/covariance (including repeated measures designs), simple and multiple regression, logistic regression, regression diagnostics, model building and path analytic techniques. FRAN*6000 can be taken before or while taking this course.

Credit Weight: 0.5 credits
Course Hours: 3-0 (36 lecture; 0 lab/seminar)
Pre-Requisite(s):
Co-Requisites(s):
Restriction(s):

2. COURSE DESCRIPTION

This course is designed to provide graduate students with a conceptual understanding of the issues and methods related to descriptive and univariate statistical analyses, regression modeling, logistic regression, multivariate analysis of variance/covariance, and repeated measures analysis of variance/covariance models (including univariate and multivariate applications) appropriate in applied social/health science research. The course covers conceptual and practical applications of statistical analyses with emphasis on selection of appropriate methods and models to address both simple and complex, multi-factorial data. This course is data driven and students will learn primarily through hands-on analytic experiences accompanied by in-class lectures and readings.

Many recent advances in computers, software, and statistics provide new "tools" for scientists to employ. Of course, those who fear statistics like the plague may wish they completed their graduate training 50 years ago when a basic understanding of regression and analysis of variance (ANOVA) was all that was required to survive! Regression and ANOVA still form the primary basis of most analytic methods and we will explore many extensions and variations of these techniques. The unique combination of backgrounds and the various foci of research among class participants make a course like this very interesting. The basic tools remain the same and

share a common language across disciplines, and the new methods you will gain will be applicable to your specific interests.

In this course you will have the opportunity to:

- Advance your knowledge about testable hypotheses and understanding how they relate to complex datasets
- Expand your abilities to work with SPSS to include univariate and multivariate analytic procedures

Not surprisingly, we will emphasize:

- Interpretation of computer output, focusing on critical components necessary for properly reporting results, and understand what story the data "tell"
- Practice writing skills necessary for technical reports, methods and results sections
- Preparation for thesis work, publication efforts, and future professional activities by adding advanced methods to the methodological "tool box"

3. TIMETABLE

Lecture: Tuesday - 11:30 - 2:20
Location: McKn-028

4. INSTRUCTIONAL SUPPORT

Course Instructor: Scott B. Maitland, Ph.D.
Email: smaitlan@uoguelph.ca
Telephone: 519-824-4120 ext. 56156
Office: 225 Macdonald Institute
Office Hours: **Wednesday 2:30 – 3:30, others by appt.**

Teaching Assistant: N/A
Email:
Office:
Office Hours:

5. LEARNING RESOURCES

Required Resource(s):

Field, A. (2017). *Discovering statistics using IBM SPSS (5th ed.)*. London: Sage. Note: earlier editions are acceptable though chapters may not align with the course outline.

The book is available at the campus bookstores or from Amazon or other sources.

The shelf price at UoG bookstores is $128.50 for print format and the eBook format for $118.75. Follow this link to purchase the e-book through UoG:

https://www.campusebookstore.com/integration/AccessCodes/default.aspx?bookseller_id=247&Course=FRAN*6010&frame=YES&t=permalink

SPSS for Windows or Mac will be used for this course. This program is available in the computer labs in MacKinnon building – however, I strongly encourage you to have a copy for yourself on your own computer. For those wishing to obtain a copy of SPSS the **free concurrent version** is available from:

http://www.uoguelph.ca/ccs/software/software-distribution

Note. I have arranged with Laerd Statistics that students in my course will receive free access to their on-line resources which include what is essentially an on-line statistics book. I am formatting the course to follow the Field book but you may choose to use Laerd, Field, both, or another stats textbook that you prefer. To get your copy of Laerd, go to this page:

https://statistics.laerd.com/pricing.php

Click on the big green button, "Apply Coupon", and enter the following coupon code:

FRAN-6010-2021

Make sure you use your uoguelph.ca email, this is the ONLY valid email to get your free copy!

We will also use the PROCESS macro by Andrew Hayes. This is an add-on to SPSS (see documents on Courselink site regarding installation):

https://www.processmacro.org/download.html

Recommended Resource(s):

American Psychological Association (2020). *Publication manual of the American Psychological Association* (7th ed.). Washington, DC: Author.

Tabachnick, B. G. & Fidell, L. S. (2018). *Using multivariate statistics* (7th ed.). New York: Pearson. (Note. Any version is good).

A good introductory statistics text to review basic concepts is also helpful.

6. LEARNING OUTCOMES

At the completion of the course, successful students will be able to:

1. Develop research questions and hypotheses, evaluate normality of data, select appropriate statistical tests and run analyses in SPSS.
2. Interpret results from analyses, report and describe results accurately, understand outcomes and next steps in the research process, as appropriate for publication and/or thesis/dissertation.

7. TEACHING AND LEARNING ACTIVITIES/CLASS SCHEDULE

Week	Topics	Assigned Readings & Assignment info
Sept 14	**Overview of stats/SPSS, hypothesis testing, basic group comparisons**	Field 1-5, 9; Optional: T&F 1-4, *Assignment #1 handed out*
Sept 21	**Hypothesis testing & basic comparisons, con't** **Begin one-way analysis of variance (ANOVA)**	Field 1-5, 10,12 Optional T&F 3, Aguinis & Harden (2009), Cortina & Landis (2009).
Sept 28	**ANOVA including two-way designs & intro to covariates (ANCOVA)**	Field 10, 12, 13 Optional: Field 6, T&F 3,6 *Assignment #1 turned in* *Assignment #2 handed out*
Oct 5	**Regression concepts and practice (Simple Linear Regression, Correlation & Partial Correlation)**	Field 8, 9 Optional: T&F 5, also Norusis 21-23 is worth copying
Oct 12	**Reading Break**	No class, note this class is rescheduled for **Thursday, December 2rd**
Oct 19	**Multiple regression (simultaneous, stepwise, and hierarchical models), model building, and diagnostics**	Field 8, 9 Optional: T&F 5, also Norusis 21-23 is worth copying. *Assignment #2 due*.
Oct 26	**Introduction to multivariate topics** **Matrix Algebra basics** **Begin Multivariate Analysis of Variance (MANOVA)**	Field 17; A skimpy intro to matrix algebra (Tabachnick & Fidell, 2007) Multivariate analysis of variance and covariance (Huberty & Petoskey, 2000) GLM Multivariate Analysis (SPSS Manual) Optional: T&F 7, 8, 17 *Assignment #3 handed out*

Week	Topics	Assigned Readings & Assignment info
Nov 2	**MANCOVA, Repeated Measures Analysis of Variance (univariate and multivariate, plus covariates)**	Field 14, 15, 16 Stevens (1996); browse Hertzog & Nesselroade (2003) for the gist of analysis of change GLM Repeated Measures (SPSS Manual)
Nov 9	**Introduction to Path Analysis**	Baron & Kenny, 1986 (required) Klem (1995) for path analysis
Nov 16	**Path Analysis: Mediators and Moderators**	Field 9, 11 Baron & Kenny, 1986 (required), Hayes info Others if interested in examples: Keller et al., x2; Navara & James, 2002; Paquet, et al., 2003; Wahlin, et al., 2003); Edwards (2009); LeBreton et al. (2009). *Turn in Assignment #3*
Nov 23	**Logistic Regression**	Field 19, 20 Afifi & Clark (1996) Optional: T&F 10, Logistic Regression (George & Mallery, 2001; Norusis, 2005)
Nov 30	**More on Logistic Regression and Discriminant Function Analysis (DFA or DA)**	Same as above **Take-home exam due date TBA**
Dec 2	**Final Class -Wrap up of all concepts**	**Note**: This is the rescheduled make-up class from October 12th

Note: T&F=Tabachnick & Fidell. This is a tentative schedule; however, due to various unknown factors there may be changes. Any changes will be announced during class and an announcement will be posted on the CourseLink site.

8. ASSESSMENT DETAILS

Assessment	LOs Addressed	Due Date	% of Final
Assignment 1	1,2	End of Wk3	10%

Assessment	LOs Addressed	Due Date	% of Final
Assignment 2	1,2	End of Wk6	20%
Assignment 3	1,2	End of Wk10	35%
Assignment 4	1,2	Dec XX	35%
		Total:	100%

9. COURSE STATEMENTS

Illness:

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g.. final exam or major assignment).

Safety Protocols:

For information on current safety protocols, follow these links: https://news.uoguelph.ca/return-to-campuses/how-u-of-g-is-preparing-for-your-safe-return/

https://news.uoguelph.ca/return-to-campuses/spaces/#ClassroomSpaces

Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives.

Disclaimer:

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email. This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (https://news.uoguelph.ca/2019-novel-coronavirus-information/) and circulated by email.

Course Website:

There is a course website at http://courselink.uoguelph.ca. All components of this course will be housed on the CourseLink site including this course outline, assignments, and links to further resources. Your assignments will be submitted through the Dropbox function. Marks and feedback will also be released on the site. Please familiarize yourself with this website as soon as possible and visit it regularly throughout the semester.

Late Assignments:

Late assignments will be accepted up to 5 days following the due date and will receive a penalty of 10% per day EXCEPT under documented grounds for compassionate consideration. Assignments submitted more than one week late without documented grounds will receive a grade of zero. If you are going to

hand an assignment in late, you must contact your course instructor to inform them when you will be submitting your assignment.

Receipt of Grades:
After you receive a grade on CourseLink, please review your feedback. Any inquiry or dispute over the grade must be made within two weeks from the date they are posted. If you fail to protest any grade during this time limit, changes to the grade will not be considered.

Turnitin Software:
In this course, your instructor will be using Turnitin, integrated with the CourseLink Dropbox tool, to detect possible plagiarism, unauthorized collaboration or copying as part of the ongoing efforts to maintain academic integrity at the University of Guelph.

All submitted assignments will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site.

A major benefit of using Turnitin is that students will be able to educate and empower themselves in preventing academic misconduct. In this course, you may screen your own assignments through Turnitin as many times as you wish before the due date. You will be able to see and print reports that show you exactly where you have properly and improperly referenced the outside sources and materials in your assignment.

10.UNIVERSITY STATEMENTS

E-mail communication:
As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

When you cannot meet a course requirement:
When you find yourself unable to meet in-course requirements due to illness or compassionate reasons, please advise the course instructor (or designated person, such as a teaching assistant) in writing with name, ID#, and email contact. See the graduate calendar for information on regulations and procedures for Academic Consideration.

Drop date:
Students have until the last day of classes to drop courses without academic penalty. The regulations and procedures for Dropping Courses are available in the Graduate Calendar.

Copies of out-of-class assignments:
Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Accessibility:

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required, however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance, and not later than the 40th Class Day.

More information: www.uoguelph.ca/sas

Academic misconduct:

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The Academic Misconduct Policy is detailed in the Graduate Calendar.

Recording of materials:

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Resources:

The Academic Calendar is the source of information about the University of Guelph's procedures, policies and regulations which apply to graduate programs.