

JSGS (803) Quantitative Methods

	UNIVERSITY OF REGINA CAMPUS	UNIVERSITY OF SASKATCHEWAN CAMPUS
INSTRUCTOR:	Tarun Katapally	
PHONE:	306-585-4544	
E-MAIL:	Tarun.katapally@uregina.ca	
OFFICE HOURS:	Tuesdays and Thursdays (3-4PM)	
OFFICE LOCATION:	102-2 Research Drive	
TERM:	Spring 2018	
ROOM:	JSGS 110.5	
DATE AND TIME:	May 14 to May 23 (10AM to 3PM)	

COURSE DESCRIPTION

This introductory quantitative methods course takes a broad and overarching approach to provide students with the necessary tools to conduct quantitative research. It starts with a description of study designs and details the development of research questions and hypotheses. Thereafter, important concepts, including measures of effect and association, which are critical to understand and apply important statistical techniques will be covered. The course also delves into subjective (survey methods) and objective methods, as well as important data collection strategies, before providing a comprehensive introduction of applied statistical techniques that are required to analyze data, which would be generated by quantitative research.

LEARNING OBJECTIVES

- To be able to conceptualize and write a quantitative research proposal
- To learn core study designs, methods, and principles of epidemiological research
- To select survey and objective methods, and associated data collection strategies
- To apply important statistical techniques required to analyze data generated from quantitative research
- To demonstrate an understanding of key assumptions of linear and logistic regressions
- To communicate a robust research proposal in written and oral format

ATTRIBUTES OF JSGS GRADUATES

1. Management, Governance, and Leadership: Ability to inspire support for a vision or course of action and successfully direct the teams, processes, and changes required to accomplish it.
2. Communication and Social Skills: Ability to communicate effectively and build enduring, trust-based interpersonal, professional relationships.
3. Systems Thinking and Creative Analysis: Ability to identify key issues and problems, analyze them systematically, and reach sound, innovative conclusions.
4. Public Policy and Community Engagement: Ability to understand how organizational and public policies are formulated, their impact on public policy and management and how to influence their development.
5. Continuous Evaluation and Improvement: Commitment to on-going evaluation for continuous organizational and personal improvement.
6. Policy Knowledge: Ability to analyze and contribute content to at least one applied policy field.

COURSE CONTENT AND APPROACH

Relevant course notes specific to each module will be provided in the class at the time of the instruction

COURSE OUTLINE AND ASSIGNMENTS

Module 1: Research Design

- Correlation vs. Causation
- Development of research questions and hypotheses
- Description of study designs from randomized trials to quasi-experimental studies

Module 2: Epidemiological Concepts

- Measures of effect and associations
- Odds ratios, relative risk, etc.
- Validity and reliability
- Confidence-intervals and p-values

Module 3: Survey Methods (Guest Lecture)

- Objective vs. subjective measures
- Role of surveys in quantitative research
- Survey development

Module 4: Objective and Advanced Methods

- Sensor-based data
- Big data
- Case example: SMART study

Module 5: Data collection strategies

- Participant recruitment strategies

- Sampling types
- Power calculations

Module 6: Basic Statistical Principles

- Mean, median, mode, standard deviation
- T-tests
- Hypothesis testing: Chi-square tests

Module 7: Introduction to SPSS and Basic Analysis Techniques

- Variable description (i.e., categorical, ordinal)
- Pearson's correlation
- Hypothesis testing in SPSS

Module 8: Bivariate Linear Regression and Interpreting Results in SPSS

- Bivariate Linear Regression overview
- Model Assumptions
- Case example and reading SPSS output

Module 9: Confounding variables and Interaction Terms

- Confounders, interactions
- DAG diagrams
- Outliers

Module 10: Multivariable Linear Regression

- Stepwise multivariable linear regression overview
- Parsimonious model development
- Case example with SPSS output

Module 11: Logistic Regression

- Logistic regression overview
- Model development and assumptions
- Case example with SPSS output

Module 12: Presentation of Research Proposals

- 20 minute presentations by each student (15 minutes of presentation, followed by 5 minute question period)

DESCRIPTION OF ASSIGNMENTS:**Research Proposal Assignment:**

- Identify and justify research question(s) and associated hypotheses
- Select appropriate research design and provide a clear rationale
- Describe methods (subjective vs. objective), and explain relevant aspects of methods such as survey development (i.e., design a brief survey associated with your study) and/or leveraging objective data.
- Propose data collection strategies, including participant recruitment/data sourcing, sampling and power calculations

- Propose an in-depth data analysis plan explaining the statistical techniques that would be used to answer each research question
- Provide a clear implications section for the quantitative research being proposed (tie back to the research question/rationale)

Research Proposal Presentation: 20-minute presentations by each student (15 minutes of presentation, followed by 5 minute question period)

REQUIRED READINGS

Rothman KJ, Greenland S, Lash T. (2012). Modern Epidemiology. 3rd ed. Philadelphia: Wolters Kluwer.

Purchasing Link: <https://www.amazon.ca/Modern-Epidemiology-Kenneth-J-Rothman/dp/1451190050>

SUPPLEMENTARY READINGS

Gordis, L. (2013). Epidemiology. 5th ed. Philadelphia: Elsevier Saunders.

EVALUATION

Assessment	Weight	Deadline
Class Participation	20%	Ongoing
Class Presentation (of Research Proposal Assignment)	20%	Last Day of Class
Research Proposal	60%	May 25

LATE ASSIGNMENTS

It is essential that assignments are submitted by the time and date specified. Late assignments will be penalized by deduction of 5% per day. In extenuating circumstances, please contact the course instructor.

STUDENTS WITH SPECIAL NEEDS

University of Regina (U of R): Students in this course who, because of a disability, may have a need for accommodations are encouraged to discuss this need with the instructor and to contact the Coordinator of Special Needs Services at (306) 585-4631.

U OF S: Students in this course who, because of a disability, may have a need for accommodations are encouraged to discuss this need with the instructor and to contact Disability Services for Students (DSS) at 966-7273.

Students Experiencing Stress

University of Regina (U of R): Students in this course who are experiencing stress can seek assistance from the University of Regina Counselling Services. For more information, please see

the attached document, visit this website:

<http://www.uregina.ca/student/counselling/contact.html>, or call (306) 585-4491 between 8:30 a.m. to 4:30 p.m. Saskatchewan time Monday to Friday.

ACADEMIC INTEGRITY AND CONDUCT

U of R: Ensuring that you understand and follow the principles of academic integrity and conduct as laid out by the University of Regina (available at <http://www.uregina.ca/gradstudies/grad-calendar/policy-univ.html>) is vital to your success in graduate school. Ensuring that your work is your own and reflects both your own ideas and those of others incorporated in your work is important: ensuring that you acknowledge the ideas, words, and phrases of others that you use is a vital part of the scholarly endeavour. If you have any questions at all about academic integrity in general or about specific issues, contact your course instructor to discuss your questions.

U OF S: Understanding and following the principles of academic integrity and conduct as laid out in the University of Saskatchewan's Guidelines for Academic Conduct is vital to your success in graduate school (available at www.usask.ca/university_secretary/council/reports_forms/reports/guide_conduct.php). Ensuring that your work is your own and reflects both your own ideas and those of others incorporated in your work is important: ensuring that you acknowledge the ideas, words, and phrases of others that you use is a vital part of the scholarly endeavour. If you have any questions at all about academic integrity in general or about specific issues, contact any faculty member and we can discuss your questions.

Cell phone use is prohibited during the class, and audio and/or video recording of the lectures is not allowed.