

JSGS 814 – BIOSTATISTICS FOR PUBLIC HEALTH

UNIVERSITY OF REGINA CAMPUS	
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OFFICE HOURS:	By appointment, via Zoom
OFFICE LOCATION:	
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ROOM:	Online
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LAND ACKNOWLEDGEMENT

The University of Saskatchewan campus of the Johnson Shoyama Graduate School of Public Policy is situated on Treaty 6 Territory and the Homeland of the Métis, while the University of Regina campus is situated on Treaty 4 Territory and the Homeland of the Métis. We pay our respect to the First Nation and Métis ancestors of this place and reaffirm our relationship with one another. As we engage in Remote Teaching and Learning, we would also like to recognize that some may be attending this course from other traditional Indigenous lands. I ask that you take a moment to make your own Land Acknowledgement to the peoples of those lands. In doing so, we are actively participating in reconciliation as we navigate our time in this course, learning and supporting each other.

HONOUR CODE

At the Johnson Shoyama Graduate School of Public Policy (JSGS), we believe honesty and integrity are fundamental in a community dedicated to learning, personal development, and a search for understanding. We revere these values and hold them essential in promoting personal responsibility, moral and intellectual leadership, and pride in ourselves and our University.

As JSGS students, we will represent ourselves truthfully, claim only work that is our own, and engage honestly in all academic assignments.

Since articulated standards and expectations can influence attitudes, and because each of us shares the responsibility for maintaining academic integrity (see below for details on academic integrity at the JSGS), we are committed to upholding the Academic Honor Code.

Academic Honour Pledge

As a member of the JSGS community, I pledge to live by and to support the letter and spirit of JSGS's Academic Honour Code.

REMOTE LEARNING CONTEXT

We acknowledge the complex circumstances – i.e., a worldwide pandemic – in which this course is taking place. Since remote teaching and learning context is new to both instructors and students, all participations should interact with empathy, patience and care. Links to online learning resources are provided below.

CALENDAR DESCRIPTION

This course will introduce students to the concepts and methods of statistics commonly used by statisticians/ non-statisticians and their application to current research problems. These concepts and techniques are useful in making a wide range of decisions in public health. Numerous examples of health-related applications are emphasized throughout the course.

LEARNING OBJECTIVES

JSGS has developed a set of three competencies that all graduates will be able to demonstrate. The specific readings, assignments and activities in JSGS 814 will help you both acquire and demonstrate the ability to:

- Utilize basic statistical methods and tools necessary to address quantitative problems specific to the health sector.
- Fit appropriate models for continuous, binary, count, repeated measurement data and time-to-event data arising from observational or experimental studies, evaluate model fit, interpret the estimated regression coefficients, and test hypotheses about these coefficients,
- Use the R statistical analysis software to construct tables and graphs and perform statistical methods for inference.
- Interpret the results of statistical analyses in the context of disease prevention and improvements in health.

ATTRIBUTES OF JSGS GRADUATES

Through the development of the following competencies, JSGS MPA graduates will be prepared to meet the policy challenges of a rapidly changing world:

- Analysis and Use of Evidence – how to use evidence and develop the necessary analytical skills to succeed in a public administration career.
- Politics and Democracy – ensuring that students have a deep understanding of the role of politics and democracy in public policy development including the roles of the various institutions and policy actors; and
- Policy Delivery – the importance of effective service delivery and the ongoing management and evaluation of public policy.

COURSE CONTENT AND APPROACH

Biostatistics for Public Health: JSGS 814 will be taught with recorded lectures and lab sessions. We will occasionally have synchronous sessions.

REQUIRED READING

No specific textbook is assigned for this class. However, the following recommended book can be useful to students:

- **Title :** Biostatistics: A Foundation for Analysis in the Health Sciences, 11th Edition
Authors: Wayne W. Daniel, Chad L. Cross
- **Title :** Essentials of Biostatistics for Public Health, Third Edition
Authors: Lisa M. Sullivan Publisher: Jones & Bartlett Learning

COURSE OUTLINE

Topic # 1 Introduction and basic concepts (Week 1)

- Role of statistics in public health
- Study designs
- Quantifying the Extent of Diseases

Topic # 2 : Descriptive Statistics and Data Exploration (Week 2)

- Measures of Central Tendency
- Measures of Dispersion
- Plotting data

Topic # 3: Statistical Inference I (Continuous Variable(s)) (Week 3)

- Estimation and Hypothesis Testing
- Statistical Tests (t-test and Analysis of variance)

Topic # 4: Statistical Inference II (Categorical Variable(s))(Week 4)

- Chi-square goodness of fit test
- Chi-square test for independence

Topic # 5: Correlation and Regression (Weeks 5 & 6)

- Correlation
- Simple Linear Regression
- Multiple Linear Regression

Topic # 6: Generalized Linear Model (Weeks 7 & 8)

- Logistic Regression (Binary outcome)
- Poisson Regression (Count data)

Topic # 7: Measuring Survival (Weeks 9 & 10)

- Time-to-Event Data and Censoring
- The Kaplan–Meier Procedure
- Comparing Survival Curves
- Cox Regression: The Proportional Hazards

Topic # 8: Longitudinal studies (Week 11)

- Concepts of fixed and random effects
- Clustering

EVALUATION

The course will be assessed via a combination of:

- multiple choice and short answer questions/quizzes completed online through URCourses
- lab assignments involving analysis of a representative & relevant data set and answering related questions arising

The aim of these assignments is to test your understanding of the statistical concepts as well as the practical data analysis and interpretive skills required to use and analyze public health data.

Grades will be assigned on the following basis: your final mark will be calculated as a percentage of total *marks achieved*. You are required to complete all assessed quizzes and lab assignments to pass the course.

LATE ASSIGNMENTS

Late assignments will be assigned a penalty of 5%; assignments more than a week late will lose a full grade of 10%; special circumstances will be considered upon application by the student.

JSGS GRADE DESCRIPTIONS

85+ excellent

A superior performance with consistent strong evidence of:

- a comprehensive, incisive grasp of the subject matter;
- an ability to make insightful critical evaluation of the material given;
- an exceptional capacity for original, creative and/or logical thinking;
- an excellent ability to organize, to analyze, to synthesize, to integrate ideas, and to express thoughts fluently; and
- an excellent ability to apply theories to real-world problems and intersect with related disciplines.

80-85 very good

An excellent performance with strong evidence of:

- a comprehensive grasp of the subject matter;
- an ability to make sound critical evaluation of the material given;
- a very good capacity for original, creative and/or logical thinking;
- an excellent ability to organize, to analyze, to synthesize, to integrate ideas, and to express thoughts fluently; and
- a strong ability to apply theories to real-world problems and intersect with related disciplines.

75-80 good

A good performance with evidence of:

- a substantial knowledge of the subject matter;
- a good understanding of the relevant issues and a good familiarity with the relevant literature and techniques;
- some capacity for original, creative and/or logical thinking;

- a good ability to organize, to analyze, and to examine the subject material in a critical and constructive manner; and
- some ability to apply theories to real-world problems and intersect with related disciplines.

70-75 satisfactory

A generally satisfactory and intellectually adequate performance with evidence of:

- an acceptable basic grasp of the subject material;
- a fair understanding of the relevant issues;
- a general familiarity with the relevant literature and techniques;
- an ability to develop solutions to moderately difficult problems related to the subject material; and
- a moderate ability to examine the material in a critical and analytical manner.

ATTENDANCE AND PARTICIPATION EXPECTATIONS

Students are expected to attend all the synchronous sessions. If you are unable to attend (e.g., Internet problems), you must let the instructor know.

Active participation in class discussions are expected by all students.

ACADEMIC INTEGRITY AND CONDUCT

Understanding and following the principles of academic integrity and conduct 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. The JSGS has developed an Honour Code (see above) that encapsulates these values.

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. For more information, please see:

Academic Integrity – <https://www.uregina.ca/gradstudies/current-students/academic-integrity/index.html>

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University of Regina Copyright information: <https://www.uregina.ca/copyright/guidelines/fair-dealing.html>

STUDENT RESOURCES

Remote learning information page for students. This resource engages students in learning about the skills associated with remote learning success.

<https://www.uregina.ca/remote-learning/>

RIGHTS & RESPONSIBILITIES OF GRADUATE STUDENTS

<https://www.uregina.ca/gradstudies/current-students/Rights%20/index.html>lights & Responsibilities of graduate students

STUDENTS WITH SPECIAL NEEDS

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 one of the following:

Centre for Student Accessibility – accessibility@uregina.ca or 306-585-4631.
<https://www.uregina.ca/student/accessibility/students/index.html>

STUDENTS EXPERIENCING STRESS

Counselling Services – <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.

USE OF VIDEO AND RECORDING OF THE COURSE

Video conference sessions in this course, including your participation, will be recorded and made available only to students in the course for viewing via Canvas after each session. This is done, in part, to ensure that students unable to join the session (due to, for example, issues with their Internet connection) can view the session later. This will also provide students with the opportunity to review any material discussed. Students may also record sessions for their own use, but they are not permitted to distribute the recordings (see below).

Please remember that course recordings belong to the instructor, the University, and/or others (like a guest lecturer) depending on the circumstance of each session, and are protected by copyright. Do not download, copy, or share recordings without the explicit permission of the instructor.

For questions about recording and use of sessions in which you have participated, including any concerns related to your privacy, please contact your instructor.

ADDITIONAL EVALUATION INFORMATION

More information on the Academic Courses Policy on course delivery, examinations and assessment of student learning can be found at:

<https://www.uregina.ca/student/registrar/resources-for-students/academic-calendars-and-schedule/undergraduate-calendar/assets/pdf/2018-2019/2018-19-UG-Calendar-05b-Academic-Regulations.pdf>