STAT 301-002 Biostatistics I- Winter 2019

Instructor: Keshav Pokhrel, Ph.D.   **Office:** 2087 CB
Phone: (313) 593-5165   **Email:** kpokhrel@umich.edu
Class Time: 12:30 pm - 1:45 pm TR   **Meeting Location:** 2046 CB

URL: `www-personal.umd.umich.edu/~kpokhrel`

Office Hours:

Monday: 10:00 - 11:00AM

Tuesday: 11:00 - 12:00PM

Thursday: 11:00AM - 12:00PM

Textbook: Biostatistics for Biological and Health Sciences 2nd Edition, by Triola, Triola, and Roy, Pearson Publishing

You can either have a hard copy of the book and "MyStatLab" access code OR "MyStatLab" access code with PDF copy of the book. I advise you to buy MyStatLab access code with pdf copy.

Course Description

This course primarily focuses on the introduction of basic statistical techniques with emphasis gearing towards life sciences. We will spend a large portion of class time in clarifying basic concepts through various examples and expect your high degree of involvement. This course will cover the study of samples; populations; quantitative vs. categorical data; clinical vs. epidemiological studies; estimation of effect size is emphasized along with the P-value ; difference of means, confidence interval and t-test; relative risk for appropriate categorical data; analysis of variance (ANOVA); correlation, and regression modeling techniques.

Major concepts covered in this course can be divided in three parts.

- Introduction of data and data visualization.

- Descriptive statistics and sampling distribution.

- Inferential statistics, linear regression analysis of variance and multiple linear regression.

Course Objectives: The primary objective of this course is to provide an introduction of statistics and its real life applications. After completion of this course the students are expected to accomplish the following objectives:

- Understand types of data and sampling techniques.

- Visualize numerical and categorical data.

- Understand the variation of data from center.

- Explain the concepts of randomness and uncertainty.

- Explain the concepts of sampling distribution and its application in real life problems.

- Compare two population means, derive and defend confidence interval for difference between two population means.

- Calculate, interpret and defend the coefficients of linear regression and their confidence interval.

- Increase students' ability to use technology and to learn from the use of technology.

- Learning from technology is expected to be achieved by using statistical packages MINITAB, SASJMP, or R.

Homework: Number of homework problem sets will be assigned using MyStatLab. Some additional homework problems will periodically be assigned during the lecture. Good news! Lowest homework grade will be dropped. Your strength in solving homework problem is highly correlated with overall performance in class. In general, homework is assigned every Tuesday night and is due on Monday night. Late assignment is accepted with 20% penalty per day.

In Class Exams and Quizzes: All the examinations and Quizzes are closed book and closed notes. The exam problems, intended for **hand calculations**, are expected to help the students to face the data and prepare them to interpret the computer outputs in real life situations. In addition to homework, we will work on worksheets in the class. Worksheets are open book, open notes and open to discuss with friends.

Project: There will be two mini projects during the semester. These are group projects. We will form groups in the class. The projects are considered to be a major vehicle to carry and reflect all the concepts you learn in the class. I will post separate project description on canvas. For a good project, you need to describe the data, pose reasonable hypotheses, select appropriate statistical tests, compute the test results, and explain the results in both statistical terms and in plain English. Primary objective of the projects is to apply the statistical methods in the real life situations, learn about working in a group. Late submission of project will result in losing 20% of total points everyday.

Software:
    We will use a software called "Minitab". It can be downloaded for free from the information technology services (ITS) wegpage. To download Minitab please visit `http://webapps.umd.umich.edu/itslabs/itsDownloads/index.html` and use your unique UM-ID and password.

Grading Policy: There will be two exams, at least 6 homework sets, 5 quizzes, two mini projects and a comprehensive final. Lowest quiz grade will be dropped. Your performance is measured by the weighted average of homework, exams, mini projects and Quizzes.

Exam I	20%
Exam II	20%
Homework	15%
Quizzes	10%
Worksheets	5%
Two Mini Projects	5%
Final Exam	25%

Grade on this course is based on your performance: i.e. you must be able to do it not simply better than the rest. There are no make-up exams and no curving. Your letter grade will be based on the following percentage distribution.

Letter Grade	≥ 97	≥ 93	≥ 90	≥ 87	≥ 83	≥ 80	≥ 77	≥ 73	≥ 70	≥ 67	≥ 63	≥ 60	< 60
Percentage	A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E

NOTE: If you have any grade disputes- you need to discuss them with me within a week of the grade being entered. Grades cannot be changed at the end of the semester.

Use of Cell Phone : Do not use cell phone as a calculator. Use of cell phone for the purpose of texting, email or other social media is not permitted.

Disability Statement: The University will make reasonable accomodations for persons with documented disabilities. Student need to register with Disability Resources Services (DSR) every semester thay are enrolled for classes. DRS is located in counseling and Support Services, 2157 UC. To be assured of having services when they are needed, students should register no later than the end of add/ drop deadline of each term. Visit the DSR website at: `http://umdearborn.edu/cs_disability`. If you have a disability that necessitates an accomodation or adjustment to the academic requirements stated in this syllabus, you must register with DRS as directed above and notify me. Upon receipt of your notification, we will make accomodation as directed by DRS.

Academic Honesty: The University of Michigan-Dearborn values academic honesty and integrity. Each student has a responsibility to understand, accept, and comply with the University's standards of academic conduct as set forth by the Code of Academic Conduct at: `http://umdearborn.edu/policies_st-rights`, as well as policies established by each college. Cheating , collusion, misconduct, fabrication, and plagiarism are considered serious offenses, and may be monitored using tools including but not limited to TurnItIn. Violations can result in penalties up to and including expulsion from the University. At the instructor,s direction, the penalty may be a grade zero on the assignment up to and including recommending that student be expelled from the University. It is the sole responsibility of the student to understand and follow academic guidelines regarding plagiarism. The University of Michigan-Dearborn has an online academic integrity tutorial that can be accessed at: `http://umdearborn.edu/umemergencyalert`.

Safety: All students are encouraged to program 911 and UM-Dearborns University Police phone number (313) 593-5333 into personal cell phones. In case of emergency, first dial 911 and then if the situation allows call University Police. The Emergency Alert Notification (EAN) system is the official process for notifying the campus community for emergency events. All students are strongly

encouraged to register in the campus EAN, for communications during an emergency. The following link includes information on registering as well as safety and emergency procedures information: If you hear a fire alarm, class will be immediately suspended, and you must evacuate the building by using the nearest exit. Please proceed outdoors to the assembly area and away from the building. Do not use elevators. It is highly recommended that you do not head to your vehicle or leave campus since it is necessary to account for all persons and to ensure that first responders can access the campus. If the class is notified of a shelter-in-place requirement for a tornado warning or severe weather warning, your instructor will suspend class and shelter the class in the lowest level of this building away from windows and doors. If notified of an active threat (shooter) you will Run (get out), Hide (find a safe place to stay) or Fight (with anything available). Your response will be dictated by the specific circumstances of the encounter.

Important Dates:

Exam 1 .... Thursday, February 14th
Exam 2 .... Tuesday, April 2nd
Mini Project I ....Due: Thursday, March 14th
Mini Project II .... Due: Tuesday , April 16th
Quizzes ....(Jan 22, Feb 5, Feb 28, March 21, April 11)
Final Exam ....Thursday, April 25 (11:30 AM-2:30PM)

January	
Tuesday	Thursday
08 Chapter 1, Syllabus, Introductions, Statistical and Critical Thinking, Statistical Vocabulary, Types of Data, Sampling Techniques	**10** Chapter 2, Tables and Graphs. 2.1 Frequency Distributions, Histograms
15 Chapter 2, Dotplots, barcharts, piecharts, scatterplots, runcharts, timeplots, individuals value plot:	**17** Chapter 3: Mean, median, mode, Interquartile range, range, standard deviation, coefficient of variation
22 Quiz 1 Chapter 3: 3.3, Measures of Position (Relative standing), Boxplots	**24** Chapter 4: Probability 4.1 and Conditional Probability, Addition and Multiplication Rule
29 Chapter 4: 4.4 Risks, Odds, Sensitivity and Specificity	**31** Chapter 5: Discrete Probability Distributions: Binomial and Poisson probability distributions.
February	
5 Quiz 2 Chapter 6: Normal distribution and CLT	**7** Chapter 6: Normal distribution and CLT
12 Exam review	**14** Exam I, Chapter 1-5
19 Point estimates, confidence intervals	**21** Point estimates, confidence intervals
26 One sample hypothesis testing and one sample t-test	**28** Quiz 3 hypothesis testing Contd.
March	
5 No Class : Spring Recess	**7** No Class : Spring Recess
12 Chapter 9: Hypothesis testing two dependent samples, two independent samples,	**14** Due: Mini Project I Chapter 9: Hypothesis testing two dependent samples, two independent samples contd..
19 Chapter 11 Goodness of fit and Test for Association (contingency tables)	**21** Quiz 4 Chapter 12: One-way ANOVA
26 Chapter 12: One-way ANOVA, test for normality and equal variances contd.	**28** Review Exam II
April	
2 Exam II	**4** Chapter 10: Correlation and regression
9 Linear regression contd.	**11** Quiz 5 Multiple linear regression
16 Due: Mini Project II Multiple linear regression contd.	**18** Review and project discussion
Final Exam: Thursday , April 25 (11:30AM- 2:30 PM)	