INSTITUTIONAL COURSE SYLLABUS TEMPLATE

Course Code: STAT 271	Course Title: Statistical Analysis
Course Instructor: Dr. ERIC BENSON	Email: Ebenson@psu.edu.sa
Credit Hours: 3	Lectures: UMWH
Office Hours: 8 AM-12PM MW 11AM-12PM UT	Prerequisite: STAT 101
Office E-323	

Mission Statement Of The General Course Department:

The mission statement of General Courses Department is to provide PSU-CW students with diverse educational opportunities by delivering high quality courses in social, health , and physical sciences that help students develop intellectual hard skills in these domains and interpersonal and transferable soft skills, such as critical thinking and analytical, management and communication skills. These capacities will empower students to achieve success across the academic programs at Prince Sultan University, to gain professional competencies for the workplace, as well as to become multi-talented and valuable community members of the society.

I.   Course Description:

This course is the intermediate course of Statistics for business students. The course is designed to expose the students to the use statistical towards estimation and inference about the population parameters from sample data. To perform statistical analyses using statistical software and interpret the results of statistical analyses**.** Statistical data analysis for business students for decision-making purposes. Includes an examination of summary measures, probability, random variables and their distributions. Presents estimation and hypothesis testing, correlation and regression analysis and ANOVA, and their applications to business problems. Analysis of

categorical data using Chi-Square test. The non-parametric distribution and their methods of testing hypothesis. The use of statistical data analysis software is an integral part of this course.

II. Course Objectives: (A summary of intended learning outcomes of the course in each domain of learning - Please refer to the specific descriptions on Pg. 4-5 of this template).

Knowledge

Students will be able to **Define** population, sample, parameter, statistic, hypothesis, and statistical hypothesis. Type of Errors.

Students would **Know** Stating Null and alternate hypothesis in Testing of means, proportions, ANOVA, regression Models, Non-parametric Tests. Rejection region/s for one and two tailed tests. Use of appropriate test statistic, approaches of rejection regions to reject /accept the hypothesis.

Students will be able to recognize Type of Errors while accepting or rejecting null hypothesis, Situations to use the appropriate test statistics and define Type of errors in application-based problems.

Cognitive Skills

Estimate Parameters mean, proportion, regression slopes by point and Interval or one sided confidence Intervals Use different integration methods to evaluate determinant

Calculate The rejection regions by using p-value approach and critical value approach. Appropriate test statistics suitable to testing of hypothesis by using small, large and complex data with calculator and statistical software

Interpersonal Skills & Responsibility

Develop Theory on the topic of research study to apply appropriate statistical methods to test statistical hypothesis
Analyze self collected data by survey or available datasets on reliable websites using statistical software

Numerical & Communication Skills

Interpret using statistical thinking for decision -making purpose in application based problems, case studies and research projects.

III. Course Content

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
Revision of Chapters 6, 7, & 8; Normal Distribution, Sampling distribution of sample statistic and Interval Estimation –large Samples	.25	1
Chapter 9- Introduction to Testing Hypothesis Hypothesis Test for Means Formulating the Hypotheses Types of Statistical Error Significance Level and critical value A Large-Sample Test of Hypothesis: Single Population Mean and Difference Between Two Population Means. A Large-Sample Test of Hypothesis for a Binomial Proportion; A Single Population Proportion and Difference Between Two Proportions Some Comments on Testing Hypothesis. Types of Errors while Testing Hypothesis: Type I Error and Type II Error Examples and exercises from textbook. Extra Practice questions uploaded on Moodle (LMS) as assignment. Case Study: Discuss as A Guide for Mini Project.	5	15
Chapter 10 Introduction of Student's t Distribution Small Sample Inferences Concerning a Mean Small Independent Samples Inferences for the Difference Between Two Population Means. Solving Examples, in class practice and extra Practice Questions on Moodle as assignment Revisiting the Small Sample. Case Study	2	6
Chapter 12 The Design of an Experiment What is ANOVA Assumptions of ANOVA The Completely Randomized Designs The ANOVA of a completely randomized design	1.75	5
Chapter 13 A Description of the Experiment Pearson's Chi-Square Statistic Testing Specified Cell Probabilities: The Goodness-of-Fit Test Contingency Tables: A Two-Way Classification.	1.25	4
Chapter 14 &Chapter 15 A Simple Linear Probabilistic Model The Method of Least Squares ANOVA for Linear Regression Testing the Usefulness of the Linear Regression Model. Multiple regression Model Analysis of Variance for Multiple Regression	1.75	5
Chapter 16 Analyzing and Forecasting Time-Series Data	2	6

Topics	No. of Weeks	Contact Hours
Chapter 9	5	15
Chapter 10	3	9
Chapter 12	1.75	5
Chapter 13	1.25	4
Chapter 14 Chapter 15	1.75	5
Chapter 16	2	6

Week #	Chapter	Topics	Teaching Method & Learning Outcomes	Activities
1. Feb 05 - 09	**Revision of Chapter 6, 7 and 8** **Chapter – 9** **Introduction to Hypothesis Testing** 9.1 Hypothesis Tests for Means	Normal Distribution, Central Limit Theorem, and Sampling distribution of sampling mean and proportion. Formulating the Hypotheses,	Lecture and self study through material and video uploaded on Moodle. Lectures, power point slides. Presenting Examples. Group discussion 1. Formulate null and alternative hypotheses for applications involving a single population mean or proportion.	Preparing answers for worksheet after watching video and reading material. Class Participation on formulating Hypothesis
2. Feb 12-16	**Chapter – 9** 9.1 Hypothesis Tests for Means	Types of Statistical Errors, Significance Level and Critical Value, Hypothesis Test for Mean when Standard Deviation known.	2. Know what Type I and Type II errors are. 3. Correctly formulate a decision rule for testing a hypothesis.	Class worksheets, Homework, Extra Practice worksheets. Each student will formulate one application-based problem. Skill Development, Business Applications and Computer Database Exercises.

3. **Feb** **19-23**	**Chapter – 9** Hypothesis Tests for Means 9.2 Hypothesis Tests for a Proportion	p-value Approach. Test for Mean, standard deviation unknown. Testing a Hypothesis about a Single Population Proportion.	**4.** Know how to use the test statistic, critical value, and p-value approaches to test a hypothesis.	Business Applications. Chapter Exercises using Excel and MyStatLab-Statcrunch, R Statistics
4. **Feb-Mar** **26 - 02**	**Chapter – 9** Hypothesis Tests for a Proportion Types of Errors	Calculating Beta, Controlling Alpha and Beta, Power of the Test	Lecture, class Lectures, Virtual Classroom. Chat room in Moodle **5.** Compute the probability of a Type II error.	Extra Practice Flipped Classroom https://ctl.utexas.edu /teaching/flipping-a-class Computer Database Exercises Using Stat Crunch.
5. Mar **05 - 09**	**Chapter – 10** **Estimation and Hypothesis Testing for Two Population Parameters** 10.1Estimation for Two Population Means Using Independent Samples	Estimating the Difference between Two Population Means When Standard Deviations are Known and Unknown using Independent Samples.	Group discussion, Lecture, class work. **1.** Demonstrate the techniques for using independent samples to test hypotheses and develop interval	Class Practice. Home work as extra practice.
6. Mar **12 - 16**	**Chapter – 10** 10.2 Hypothesis Tests for Two Population Means Using Independent Samples	Testing for Difference between Two Population Means When standard deviations are Known and Unknown using Independent Samples.	Lecture, Group Discussion. **2.** Carry out hypothesis tests and establish interval estimates, using sample data, for the difference between two population proportions	MyStatLab Class Participation,

Week	Chapter/Section	Topics	Methods	Activities
7. Mar 19 - 23	**Chapter – 10** 10.4 Estimation and Hypothesis Test for Two Population Proportions	Estimation the Difference between Two Population Proportions Hypothesis Tests for the Difference between Two Population Proportions.	Lecture, Solving Examples 3. Carry out hypothesis tests and establish interval estimates, using sample data, for the difference between two population proportions	Class Practice. Extra Practice Skill Development, Business applications, Computer Database Exercises.
8. **Mar** *26 – 30*	**Chapter – 12** **Analysis of Variance** 12.1 One-Way Analysis of Variance	Introduction to One-Way ANOVA, Partitioning the Sum of Squares, ANOVA assumptions. Applying ANOVA.	Lecture, Problems done in class. 1. Understand the basic logic of analysis of variance. 2. Perform a hypothesis test for a single-factor design using analysis of variance manually and with the aid of Excel software.	
9. Apr **09 - 13**	**Chapter – 12** 12.1 One-Way Analysis of Variance	The Tukey-Kramer Procedure for Multiple Comparison	Lecture, Problems discussed in class. Discussion Board on Tukey-Kramer through Moodle 3. Conduct and interpret post-analysis of variance pairwise comparison procedures.	Watch Video on Tukey- Kramer. Applying the Procedure. Business Application and Computer Database Problems using Excel and MyStatLab. Extra Practice Worksheets
10. Apr **16 - 20**	**Chapter – 13** Goodness-of-Fit Tests and Contingency Analysis	Introduction to Goodness-of-Fit Tests Chi-Square Goodness-of-Fit Test	Lecture, Group Discussion, Problems discussed in class. 1. Utilize the chi-square goodness-of-fit tests to determine whether data from a process fit a	Online assignment.

			specified distribution	
11. Apr - **23 - 27**	**Chapter – 13** 10.2 **Chapter – 14** **Introduction to Linear Regression and Correlation Analysis** **14.1** Simple Linear regression Analysis	Introduction to Contingency Analysis 2x2 Contingency Tables rxc Contingency Tables Meaning of the Regression coefficients Least Squares Regression Properties Coefficient of Determination. Significance of Slope Coefficient	Lectures through power point. Group Discussions. **2.** Set up a contingency analysis table and perform a chi-square test of independence. Review Bivariate data. Lectures	Formulating real situation problem through group discussion. Data Collection for rxc contingency Tables. Business Applications and Computer database Exercises using Excel and MyStatLab .
12. Apr **30 - 04**	**Chapter – 14** **14.2** **14.3** **Chapter 15** **Multiple**	Uses for Regression Analysis Regression Analysis for Prediction	Lecture. Power point presentation **1.** Calculate, interpret and and the correlation between two variables. **2.** Determine whether the correlation is significant. **3.** Calculate the simple linear regression equation f **4.** Determine whether a regression model is significant and the purpose of prediction. **1.** Understand the general	**Submission of All Projects/ Case studies/ Computer Database Exercises.**

	Regression Analysis and Model Building 15.1 Introduction to Multiple Regression Analysis	Basic Model Building Concepts, Model Diagnosis, computing the Regression Equation, Adjusted R-Squared, Confidence	concepts behind model building using multiple regression analysis. Apply the concepts to business decision making situations. 2. Analyze the computer output for a multiple regression model and interpret the regression results. 3. Test hypotheses about the significance of a multiple regression model and test the significance of the independent variable in the model. 4. Recognize potential problems when using multiple regression analysis to take steps to correct the problems.	
13.May 07 – 11	**Chapter 15** 15.1 Introduction to Multiple Regression Analysis	Interval Estimation for Regression Coefficients.	Lectures. Examples, Business situations.	Extra Practice Worksheet from Skill Development, Business Applications, Computer Database exercises. Projects continued from case studies, database problems, self data collected from real time situations. Flipped classroom on Incorporating Dummy Variables

14. May **14 – 18**	**Chapter –16** **Analyzing and Forecasting Time-Series Data** 16.1 Int. to Forecasting Time-Series Data and Index Numbers	General Forecasting Issue. Components of Time Series. Introduction to Index Numbers. Aggregate Price Index. Weighted Aggregate Price Index. Commonly Used Index Numbers.	Power point slides. Lecture. In-class practice. Group Discussion identifying problems in Finance. 1. Identify the components present in Time series. 2. Understand and compute basic index numbers.	Flipped Classroom. Conceptual Questions, Business Applications, Computer Database Exercises using statcrunch.
15.May- **21 – 25**	**Chapter –16** 16.2 Trend-Based Forecasting Techniques	Developing the trend based Forecasting Techniques. Comparing the Forecasting values to Actual Data. Adjusting for Seasonality.	3. Apply fundamental steps in developing and implementing forecasting models. 4. Apply trend-based forecasting models, including linear trend and seasonally adjusted trend.	
16. May **28-29**		**Reading Days**		

IV. Course Components

Component	Contact Hours
Lecture	3
Tutorial	0

V. Teaching Strategies

Domain	Strategy
Knowledge	Lectures, Concept presentation
Cognitive Skills	Assignments, Majors and Final Examination
Interpersonal Skills & Responsibility	Class Participation & Attendance, Major Exams, Final Examination, Quizzes
Numerical & Communication Skills	Oral, Written Tests and Assignments,

VI. Course Requirements: - Project, examinations, quizzes, assignments
VII. Student Assessment

A. Assessment Task

Domain	Assessment Task
Knowledge	Oral questions
Cognitive Skills	Major, Quiz, Final
Interpersonal Skills & Responsibility	Group discussions, Project
Numerical & Communication Skills	Major, Quiz, Final, Presentation

B. Schedule of Assessment (Dates are fixed and Students have to appear in their registered Sections. In case of not showing, students will be penalized with ABSENT)

Assessment	Assessment Task	Week Due	Proportion of Final Assessment
1	**Quiz # 1**	**Sec 463 & 543 Thursday, March 01 2017**	4%
2	**Major 1 Ch 9 -10**	**Sec 463 & 543 14 Mar 2017 6pm – 7:30pm**	20%
3	**QUIZ # 2**	**Sec 463 & 543 Thursday, March 30, 2017**	4%
4	**QUIZ # 3**	**Sec 463 & 543, April 13, 2017**	4%
5	**Major 2 Ch 12, 13, 14 & 15**	**Sec 463 & 543 Tues 25 April 2017**	20%
6	**Online Worksheets (from each chapter)**	**Throughout the semester**	5%
7	**Projects (2)**	**3-12**	3%
8	**Final exam**	**TBA**	40%

VIII.   Learning Resources

A. **Text Book**: **Business Statistics, A Decision Making Approach by Groebner 9th edition**
   Recommended Texbooks:

- Statistics for Management and Economics, by Gerald Keller
- Elementary Statistics 10th Edition by Mario F. Triola

B.   Facilities Required - lecture room, computing resources, Excel Analysis Tool Pak, Statcrunch, Databases

C.   Learning Management System –Website, LMS, My Stat Lab etc.

Grading system

A$^+$= 95-100%   A= 90-94%   B$^+$= 85-89%

B=80-84%   C+= 75-79%   C=70-74%

D$^+$=65-69%   D=60-64%   F Less than 60 %

Class attendance:
- Students should not miss any lecture without a legitimate excuse. In case a student misses a class, she must contact anyone of her classmates to get all information and topics covered of classes she missed, and then she is welcomed for any question.
- "DN"Grade" will be issued to a student who misses 13 classes.
- A student will be marked as late when entering class 10 minutes after the appointed class time and 3 lates will be counted as one absence.

Course Rules:
• There will be 2 quizzes

BOTH QUIZZES ARE COUNTED SO DON'T MISS ANY QUIZ.

• THERE WILL BE NO MAKE-UP QUIZZES FOR STUDENTS WHO MISS A QUIZ AND YOU WILL GET A ZERO FOR THE QUIZ.

• IF A STUDENT MISSES A MAJOR EXAM WITH AN ACCEPTABLE EXCUSE, THEN SHE SHOULD GET PERMISSION FROM THE STUDENTS' AFFAIRS OFFICE WITHIN A WEEK. PROPER DOCUMENTS SHOULD BE PROVIDED.

• Keep your mobile on silent during lectures

• Exam Dates are fixed.

   Do not wear *Abaya, pants, short sleeved shirts, short skirts (i.e., close or above knees)*.

Attention

The major exam will not be repeated except for the following three reasons:

(a)   *Having surgery done*

(b)   *Loss of relative (first level).*

The makeup exam will not be repeated to any absent student and it will be within ten days after original exam's date

.

Warning and DN system:

Absences	Action
4 or more	*First Warning*
8 or more	*Second warning*
13 or more	*DN*