ALLAMA IQBAL OPEN UNIVERSITY ISLAMABAD
(Department of Business Administration)
*****

BUSINESS STATISTICS (BBA-133)

(CHECKLIST)

SEMESTER: AUTUMN 2013

This packet comprises the following material:

1.   Text Book
2.   Course Outline
3.   Assignment No 1 & 2
4.   Assignment Forms (2 sets)

If you find anything missing out of the above-mentioned material, please contact at the address given below:

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Course Coordinator

ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD
(Department of Business Administration)

ASSIGNMENT No. 1

Course: Business Statistics (133)   **Semester:** Autumn 2013
Level: BBA   **Total Marks:** 100

Note: All questions carry equal marks.

Q. 1 The mine superintendent of the Sarhad Coal Co has recorded the amount of time per workshift that Section Crew A shuts down its machinery for the adjustments, repairs and moving. Here are the records for the crews last 35 shifts;

60	72	126	110	91	115	112
80	66	101	75	93	129	105
113	121	93	87	119	111	97
102	116	114	107	113	119	100
110	99	139	108	128	84	99

(a) Arrange the data in array from highest to lowest.
(b) It is believed that a typical amount of downtime per shift is 108 minutes. How many of crew A last 35 shifts exceeded this limit? How many were under the limit?
(c) Construct a relative frequency distribution with 10-minute intervals.   **(20)**

Q. 2 Imran Khan, owner of a Bakery found that the average weekly production level of his company was 11,398 loaves, and the variance was 49,729. If the date used to compute the results were collected for 32 weeks. During how many weeks was the production level below 11,175? Above 11,844?   **(20)**

Q. 3 (a)   Two events, A and B are statistically dependent. If
P(A)=0.39, P(B)=0.21, and P(A or B)=0.47
Find the probability that
i.   Neither A nor B will occur
ii.   Both A and B will occur
iii.   B will occur, given that A has occurred
iv.   A will occur, given that B has occurred.

2

(b) Given that
P(A)=3/14,   P(B)=1/6, P(C)=1/3,   P(AC)=1/7, and P(B/C)=5/21
Find the following probabilities: P(A/C), P(C/A), P(BC) and P(C/B)   **(20)**

Q. 4 The pressroom supervisor for a daily newspaper is being pressured to find ways to print the paper closer to distribution time, thus giving the editorial staff more margin for last-minutes changes. She has the option of running the presses at normal speed or at 110 percent of normal "Fast" speed. She estimates that they will run at the higher speed 60 percent of the time. The roll of paper (the newsprint "web") is twice as likely to tear at the higher speed, which would mean temporarily stopping the presses.
(a) If the web on a randomly selected printing run has a probability of 0.112 of tearing, what is the probability that the web will not tear at normal speed?
(b) If the probability of tearing on fast speed is 0.20, what is the probability that a randomly selected torn web occurred on normal speed?   **(20)**

Q. 5 A company is considering upgrading its computer system, and a major portion of the upgrade is a new operating system. The company has asked an engineer for an evaluation of the operating system. Suppose the probability of a favorable evaluation is 0.65. If the probability the company will upgrade its system given a favorable evaluation is 0.85. What is the probability that the company will upgrade and receive a favorable evaluation?   **(20)**

ASSIGNMENT No. 2
(Total Marks: 100)

Q. 1 (a) Seventy data clerks at a large manufacturing Co. make an average of 27 errors per day normally distributed with a standard deviation of 4. An auditor can check the work of 22 clerks per day. What is the probability that the average number of errors in a group of 22 clerks checked on one day is:
   i.   Fewer than 25?
   ii. Greater than 30?
(b) Sui northern gas has determined that the cost per 100 sq ft for the residential population electrical service is Rs.3.50 on average, with a standard deviation of Rs.0.60. Two different samples are selected at random, and the means are Rs. 3.10 and Rs.3.80 respectively. The assistant in charge of data collection concludes that the second sample is the better one because it is better to overestimate than underestimate the true mean. Comment. Is one of the means "better" in some ways, given the true population mean?   **(20)**

Q. 2 A graduate students has just completed a first draft of his 700 page dissertation. He has typed his paper himself and is interested in knowing the average number of typographical errors per page, but does not want to read the whole paper. Knowing

3

a little bit about business statistics, he selected 40 pages at random to read and found that the average number of typos per page was 4.3 and the sample standard deviation was 1.2 typos per page.

(a) Calculate the estimated standard error of the mean.
(b) Construct a 90 percent confidence interval for the true average number of typos per page in his paper.   **(20)**

Q. 3 The university bookstore is facing significant competition from off-campus bookstores, and they are considering targeting a specific class in order to retain student business. The bookstore randomly sampled 150 freshmen and 175 sophomores. They found that 46 percent of the freshmen and 40 percent of the sophomores purchase all of their textbooks at the university bookstore. At $\alpha = 0.10$, is there a significant difference in the proportions of freshman and sophomores who purchase entirely at the university bookstore?   **(20)**

Q. 4 Mecca Cola is studying the effect of its latest advertising campaign. People chosen at random where called and asked how many cans of Mecca cola they had bought in the past week and how many Mecca Cola advertisements they had either read or seen in the past week.

X (number of ads)	3	7	4	2	0	4	1	2
Y (cans purchased)	11	18	9	4	7	6	3	8

(a) Develop the estimating equation that best fits the data
(b) Calculate the sample coefficient of determination and the sample coefficient of correlation.   **(20)**

Q. 5 A foods company has added broiled whole chickens to its line of takeout food for busy professionals who don't have time to cook at home. The number of precooked chickens sold in the first 7 weeks is as follows:

Week	1	2	3	4	5	6	7
Sales	41	52	79	76	72	59	41

(a) Find the linear regression line that best fits these data
(b) Estimate the expected number of sales for week 8
(c) Based on the estimate in part (b) and the available data, does the regression accurately describe the sales trend for this item?   **(20)**

BUSINESS STATISTICS (BBA-133)
COURSE OUTLINE

UNIT-1 INTRODUCTION TO STATISTICS
- Definition of Statistics
- Descriptive and Inferential Statistics
- Role of Statistics in Business
- Constructing a Frequency Distribution
- Graphing Frequency Distribution
  - Line Chart
  - Bar Chart
  - Multiple Bar Chart
  - Pie Chart
- Frequency Distribution for Qualitative Data
- Graphical Display of Data
- Graphic Display of Qualitative Frequency Distributions
- Grouped Frequency Distribution
- Cumulative Frequency Distribution
- The Ogive
- Distribution Shapes

UNIT-2: DESCRIPTIVE STATISTICS
- Measures of Central Tendency
  - Mean (Arithmetic, Weighted and Geometric Means)
  - Median
  - Mode
- Choosing Measures of Central Tendency
- Percentiles, Deciles, and Quartiles
- Measures of Dispersion
  - Range and Semi-Interquartile Range
  - Variance
  - Standard Deviation
  - The Coefficient of Variation
  - Interpretations
  - Skewness and Kurtosis
- Measures of Skewness and Peakedness

UNIT-3: PROBABILITY - I
- Set Theory
- Sample Spaces and Events
- Elementary Principles of Probability
- Types of Probability
- Probability Rules
- The Calculation of Probabilities
- Bayes's Rules
- Combinations and Permutations

UNIT-4:   PROBABILITY - II
- Introduction to Probability Distribution
- Random Variables
- Discrete Probability Distribution
- Use of Expected Value in Decision Making
- Continuous Probability Distribution
- The Binomial Distribution
- Hypergeometric Distribution
- The Poisson Distribution
- The Normal Distribution
- The Central Limit Theorem

UNIT-5:   SAMPLING AND SAMPLING DISTRIBUTION
- Population and Samples
- Parameters and Estimates
- Introduction to Statistical Inference
- Introduction to Sampling
- Importance of Sampling in Statistics
- Random Sampling
- Stratified and Proportional Stratified Sampling
- Other Sampling Procedures
- Errors in Sampling
- Sampling Distribution
- Point and Interval Estimation
- Using Sampling Distributions to Make Inferences
- The Relationship between Sample Size and Standard Error

UNIT-6:   ESTIMATION
- Point Estimation
- Methods of Obtaining Point Estimator
- Interval Estimation and Confidence Intervals
- Estimation of Means
- Estimation of Differences between Means
- Estimation of Proportions
- Estimation of Variances
- Estimating Required Sample Size

UNIT-7:   TEST OF HYPOTHESIS
- Role of Statistical Hypothesis
- Formulating Hypothesis
- The Null Hypothesis and Error Type
- One Sided and Two-Sided Tests
- Testing Hypothesis about Single Sample Means
- Testing Hypothesis about Two Independent Sample Means
- Hypothesis Testing of Proportions- Large Samples
- Testing for Differences between Means and Proportions
- The Importance of Sampling Distribution as Probability
- Distribution

- Probability Distributions: z, t, X^2 and F Distribution
- Interpretations Based on Tests of Hypothesis Goodness of Fit

UNIT-8: REGRESSION AND CORRELATION ANALYSIS
- The Functional Relationship between Two Variables
- The Error Component and the Principle of Least Squares
- The Linear Regression Equation: Line of Best Fit
- Calculating the Regression Equation
- Evaluating a Regression Equation
- Linear Correlation
- Inferences Concerning Correlation Coefficients
- Factors Affecting the Correlation Coefficient
- Multiple Regression and Correlation Analysis

UNIT-9: TIME SERIES AND INDEX NUMBERS
- Introduction to Time Series
- Variations in Time Series
- Trend Analysis
- Cyclical Variation
- Seasonal Variation
- Irregular Variation
- Time Series Analysis in Forecasting
- Defining an Index Number
- Unweighted Aggregate Index
- Weighted Aggregate Index
- Quantity and Value Indices

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