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TERM: II
YEAR: 2016-2017
BATCH: I

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Course Introduction: The illustrious writer H.G. Wells stated that "*Statistical thinking will one day be as necessary for efficient citizenship as the ability to read and write*." That time is upon us now and the statement is even truer for managerial competence. Statistics is a tool required by managers to analyze, interpret and solve business problems. It gives them an objective perspective on problem at hand. This course addresses the need to get acquainted with the basic concepts and areas of managerial applications of statistics. When at a crossroad, it will enable students to draw from a range of techniques the appropriate scientific method to evaluate the outcomes of different courses of action. Successful completion would help the students to use analytical reasoning in business decision making.

Learning Outcomes:
1.   To enable the student to gain a quantitative orientation.
2.   To introduce concepts of statistics
3.   To facilitate hands-on practice of statistical analysis.
4.   To understand statistics from a business application perspective through case discussion.

Course Pedagogy: The sessions will be a blend of interactive lectures and discussions and will be supplemented by cases and exercises. **Students are expected to come prepared and participate in the discussions.**

Course Readings:
Text books
1.   Levin, R.I. & Rubin, D.S. (2012). *Statistics for Management*. Pearson Education, New Delhi.
2.   Anderson. D.R., Sweeney, D.J. & Williams, T.A. (2011). *Statistics for Business and Economics*. Cengage Learning.
Reference book(s)
1.   Huff, D. (1993) *How to Lie with Statistics*. W.W. Norton & Company.

Course Evaluation criteria:

Class participation (Including Case preparation, discussion & presentation)	20%
Quiz (2)	20%
Mid-term	30%
End-term	30%
Total	**100%**

Quiz 1 and 2 will be held after 9 and 18 sessions, respectively.

Session Plan:

Session	Topic	Learning Outcomes	Reading
1.	**Introduction to course** **Frequency Distribution** **Probability Distribution** ❖ Discrete & continuous random variable ❖ Discrete probability distributions: Binomial & Poisson	LO – 1 LO - 2	**Text book:** Ch. 3 (Pages 74-134) Ch. 5 (Pages 210-217) Ch. 5 (Pages 225-244) **Attempt:** Review & application exercises: 3-92 (p. 146), 3-100 (p. 147) Applications: 5-22, 5-26 (p. 236-237)
2.	**Continuous Probability distribution – Normal distribution** ❖ Characteristics of Normal distribution ❖ Uses of Normal distribution ❖ Standard normal probability distribution ❖ Normal approximation to binomial distribution **Choosing the correct probability distribution**	LO – 1 LO – 2 LO – 3 LO – 4	**Text book:** Ch. 5 (Pages 246-263) **Attempt:** Applications: 5-41, 5-42, 5-46, 5-49 (p. 260-261) **Case:** *Specialty toys*
3-4.	**Sampling and sampling distribution** ❖ Sampling error ❖ Non-sampling error ❖ Sampling distribution of mean ❖ Standard error ❖ Central Limit Theorem ❖ Relationship between sample size and standard error	LO – 1 LO – 2 LO – 3 LO – 4	**Text book:** Ch. 6 (Pages 278-290; 296-316) **Attempt:** Applications: 6-32, 6-38 (p. 311-312) **Case:** *Acceptable pins* **Read:** Random sampling with Excel
5-6.	**Estimation** ❖ Point estimation ❖ Interval estimation ❖ Confidence interval and confidence level ❖ Confidence interval for mean using z-distribution **Testing hypotheses (One sample – large sample)** ❖ Level of significance	LO – 1 LO – 2 LO – 3 LO – 4	**Text book:** Ch. 7 (Pages 328-347) Ch. 8 (Pages 380-399) **Attempt:** Applications: 7-15 (p. 340), 7-29 (p. 348), 7-34 (p. 348), 7-46 (p. 363) Applications: 8-27, 8-31 (p.

	❖ Type I and type II errors ❖ 2-tailed and 1-tailed tests of hypothesis		400-401) **Case:** *Quality associates, Inc.*
7-8.	**Testing hypotheses (One sample - small sample)** ❖ Confidence interval for mean using t-distribution ❖ Degrees of freedom ❖ 2-tailed and 1-tailed tests of hypothesis	LO – 1 LO – 2 LO – 3 LO – 4	**Text book:** Ch. 7 (Pages 353-358) Ch. 8 (Pages 411-414) **Attempt:** Applications: 7-46, 7-49 (p. 363), 8-47, 8-50 (p. 416-417) **Case:** *Cutcraft Cutlery Corporation*
9.	**Sample size and other concepts** ❖ Sampling procedures ❖ Relationship between sample size and standard error ❖ Determining the sample size in estimation ❖ Concept of p-value ❖ Measuring the power of a hypothesis test	LO – 1 LO – 2 LO – 3 LO – 4	Ch. 6 (Pages 278-290) Ch. 7 (Pages 378-380) Ch. 9 (Pages 485-488) Ch. 8 (Pages 424-426) **Attempt:** Applications: 8-30 (p. 400), SC 8-12 (p. 416), 8-51 (p. 417), 8-53, 8-55 (p. 419)
10-11.	**Testing hypotheses: Two sample test (Differences of population means)** ❖ Large sample test ❖ Small sample test ❖ Dependent samples	LO – 1 LO – 2 LO – 3 LO – 4	**Text book:** Ch. 9 (Pages 426-449) **Attempt:** Applications: 9-2, 9-3 (p. 432); 9-8, 9-9 (p. 442-443); SC 9-6, 9-17 (p. 453-453) **Case:** *Tiresome Tires – II*
12.	**Testing hypotheses: One-sample and Two-sample test (Proportion and difference between proportions)** ❖ Hypothesis testing of proportions: Large samples ❖ Tests for difference between proportions: Large samples	LO – 1 LO – 2 LO – 3 LO – 4	**Text book:** Ch. 5 (Pages 225-235) Ch. 7 (Pages 349-351) Ch. 8 (Pages 405-409) Ch. 9 (Pages 455-462) **Attempt** Ex. 8.6: SC 8-10 (p. 410) Applications: 8-39, 8-43 (p. 410-411) Ex. 9.5: 9-23, 9-25 (p. 463)

13-14.	**Chi-square test** ❖ Test of independence ❖ Comparing proportions	LO – 1 LO – 2 LO – 3 LO – 4	**Text book:** Ch. 11 (Pages 532-545) **Attempt:** Applications: 11-7, 11-11, 11-13 (p. 545-546) **Case:** *Airline satisfaction survey*
15-16.	**Analysis of variance (ANOVA): One-way** ❖ Between treatments estimate of population variance ❖ Within treatments estimate of population variance ❖ F-test	LO – 1 LO – 2 LO – 3 LO – 4	**Text book:** Ch. 11 (Pages 555-576) **Attempt:** Applications: 11-28 (p. 577), 11-34 (p. 579), 11-38 (p. 580) Applications: 11-65, 11-66 (p. 631) **Case:** *Wentworth medical center*
17-18.	**Correlation and Simple Regression Analysis** ❖ Estimation using the regression line ❖ Correlation analysis ❖ Making inferences about population parameters	LO – 1 LO – 2 LO – 3 LO – 4	**Text book:** Ch. 12 (Pages 610-666) **Attempt:** Applications: 12-10 (p. 615), 12-16 (p. 638), 12-21 (p. 640), 12-24 (p. 641), 12-31 (p. 656) & 12-37 (p. 662) **Case:** *Measuring stock market risk*
19-20.	**Time Series Analysis** ❖ Trend analysis ❖ Cyclical variation ❖ Seasonal variation ❖ Irregular variation	LO – 1 LO – 2 LO – 3 LO – 4	**Text book:** Ch. 15 (Pages 818-858) **Attempt:** Ex. 15-12, 15-13 (p. 829-830), 15-20 (p. 836), 15-28 (p. 845). **Case:** *Forecasting food and beverage sales*