

INTERNATIONAL MANAGEMENT INSTITUTE, BHUBANESWAR
PROGRAMME NAME: POST GRADUATE DIPLOMA IN MANAGEMENT (PGDM)
BUSINESS STATISTICS (QM502)
CREDIT: FULL (3 CREDITS)
SESSION DURATION: 90 MINUTES

TERM: II
YEAR: 2017-2018
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:

1. Levin, R.I., Rubin, D.S., Siddiqui, M.H., and Rastogi, S. (2012). *Statistics for Management*, 8th Edition. Pearson Education, New Delhi.
2. 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 <ul style="list-style-type: none"> ❖ 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), 3-99 (p. 147) Applications: 5-22, 5-26 (p. 236-237)
2.	Continuous Probability distribution - Normal distribution <ul style="list-style-type: none"> ❖ 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 Case: <i>Specialty toys</i>
3-4.	Sampling and sampling distribution <ul style="list-style-type: none"> ❖ 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: <i>Acceptable pins</i> Read: Random sampling with Excel
5-6.	Estimation <ul style="list-style-type: none"> ❖ Point estimation ❖ Interval estimation ❖ Confidence interval and confidence level ❖ Confidence interval for mean using z-distribution Testing hypotheses (One sample - large sample) <ul style="list-style-type: none"> ❖ Level of significance ❖ Type I and type II errors ❖ 2-tailed and 1-tailed tests of hypothesis 	LO – 1 LO – 2 LO – 3 LO – 4	Text book: Ch. 7 (Pages 316-334) Ch. 8 (Pages 366-385) Attempt: Applications: 7-15 (p. 328), 7-27 (p. 335) Applications: 8-27, 8-30, 8-31 (p. 386-387) Applications: 8-27, 8-31 (p. 400-401) Case: <i>Quality associates, Inc.</i>
7-8.	Testing hypotheses (One sample - small sample) <ul style="list-style-type: none"> ❖ Confidence interval for mean using t- 	LO – 1 LO – 2 LO – 3	Text book: Ch. 7 (Pages 341-346) Ch. 8 (Pages 397-400) Attempt: 7-41, 7-43 (p. 350), 8-

	<ul style="list-style-type: none"> distribution ❖ Degrees of freedom ❖ 2-tailed and 1-tailed tests of hypothesis 	LO – 4	45, 8-47, 8-48, 8-50 (p. 402-403) Case: <i>Cutcraft Cutlery Corporation</i>
9.	Sample size and other concepts <ul style="list-style-type: none"> ❖ 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 268-280); Ch. 7 (Pages 351-353) Ch. 9 (Pages 450-454); Ch. 8 (Pages 388-390) Attempt: Applications: SC 8-12 (p. 402), 8-51 (p. 403), 8-53, 8-55 (p. 405-406)
10-11.	Testing hypotheses: Two sample test (Differences of population means) <ul style="list-style-type: none"> ❖ Large sample test ❖ Small sample test ❖ Dependent samples 	LO – 1 LO – 2 LO – 3 LO – 4	Text book: Ch. 9 (Pages 412-435) Attempt: Applications: 9-2, 9-3 (p. 418); 9-7, 9-8 (p. 429); SC 9-6, 9-17 (p. 438-439) Case: <i>Tiresome Tires – II</i>
12.	Testing hypotheses: One-sample and Two-sample test (Proportion and difference between proportions) <ul style="list-style-type: none"> ❖ 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 <ul style="list-style-type: none"> ❖ Test of independence ❖ Comparing proportions 	LO – 1 LO – 2 LO – 3 LO – 4	Text book: Ch. 11 (Pages 518-531) Attempt: Applications: 11-7, 11-11, 11-13 (p. 532-533) Case: <i>Airline satisfaction survey</i>
15-16.	Analysis of variance (ANOVA): One-way <ul style="list-style-type: none"> ❖ 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 542-553) Attempt: Applications: 11-27 (p. 564), 11-32, 11-35 (p. 565-566) Applications: 11-60, 11-61 (p. 588) Case: <i>Wentworth medical center</i>

17-18.	Correlation and Simple Regression Analysis <ul style="list-style-type: none"> ❖ 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 596-614, 629-638) Attempt: Applications: 12-10 (p. 601-602), 12-16 (p. 624-625), 12-21 (p. 626), 12-24 (p. 627), 12-31 (p. 642) & 12-37 (p. 648) Case: <i>Measuring stock market risk</i>
19-20.	Time Series Analysis <ul style="list-style-type: none"> ❖ 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: <i>Forecasting food and beverage sales</i>