INTERNATIONAL MANAGEMENT INSTITUTE, BHUBANESWAR
PROGRAMME NAME: POST GRADUATE DIPLOMA IN MANAGEMENT (PGDM)
BUSINESS STATISTICS (QM502)
CREDIT: 2 CREDITS
SESSION DURATION: 60 MINUTES

TERM: II
ACADEMIC YEAR: 2019-2020
BATCH: PGDM (2019-2021)

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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:

LO-1: To enable the student to gain a quantitative orientation and understand statistics from a business application perspective.

LO-2: To use the range, variance, and standard deviation to describe how data "spread out"; and to introduce the probability distributions concept.

LO-3: To introduce the concept of sampling and to learn how to use the t distribution to make interval estimates when the normal distribution cannot be used.

LO-4: To learn when to use one-tailed tests and two-tailed tests.

LO-5: To understand how and when to use the normal and t distributions for testing hypotheses about population means and proportions; how hypothesis tests for differences between population means take different forms; and how to test hypotheses that compare the proportions of two populations.

LO-6: To recognize situations requiring the comparison of more than two means or proportions.

LO-7: To learn how many business decisions depend on knowing the specific relationship between two or more variables (regression analysis).

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*, 7th Edition. Pearson Education, New Delhi.
2.   Huff, D. (1993) *How to Lie with Statistics*. W.W. Norton & Company.

Course Evaluation criteria:

Evaluation Components	Learning Outcomes	Weightage (%)
Class Participation (Including Case Discussion and Assignment)	LO – 1, 2, 3, 4, 5, 6, 7	20%
Quiz (2)	LO - 2, 3, 4, 5, 6, 7	20%
Mid-Term	LO – 2, 3, 4	30%
End-Term	LO – 5, 6, 7	30%
	Total	**100%**

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

Academic integrity

We are committed to upholding the highest standards of academic integrity and honesty. Plagiarism is the use of or presentation of ideas, works that are not one's own and which are not common knowledge, without granting credit to the originator. You may refer the already available content just for your reference and to get the basic ideas. Only 20% of such content is acceptable, above that comes under the definition of Plagiarism which is unacceptable in IMI and will be treated seriously. All such cases will be referred to the appropriate body of the Institute for suitable disciplinary action.

Session Plan*:

Session	Topic	Learning Outcomes	Readings
1-3	**Introduction to course** **Measures of Central Tendency and Dispersion in Frequency Distributions** ❖ A measure of central tendency ❖ Dispersion, ranges **Probability Distributions** ❖ What is a probability distribution? ❖ Random variables ❖ The Binomial and Poisson distribution ❖ The normal distribution: a distribution of a continuous random variable	LO – 1 LO – 2	**Text book:** Ch. 3 (Pages 74-134) Ch. 5 (Pages 210-217; 225-243; 246-263) **Case:** *Specialty toys*

4-5	**Sampling and sampling distribution** ❖ Types of sampling; sampling and non-sampling error ❖ Random and non-random sampling ❖ Sampling distribution of mean ❖ Standard error of the mean ❖ Central limit theorem ❖ Relationship between sample size and standard error ❖ Finite population multiplier	LO – 1 LO – 3	**Text book:** Ch. 6 (Pages 278-290; 296-316) **Read:** Random sampling with MS-Excel **Case:** *Acceptable pins*
6-7	**Estimation** ❖ Point estimation ❖ Interval estimation ❖ Confidence level and confidence interval ❖ Calculating interval estimates of the mean from large samples ❖ Calculating interval estimates of the proportion from large samples ❖ Interval estimates using the *t* distribution ❖ Degrees of freedom ❖ Determining the sample size in estimation	LO – 1 LO – 3	**Text book:** Ch. 7 (Pages 328-368)
8-10	**Testing hypotheses: One – sample tests** ❖ Testing hypotheses and interpreting the significance level ❖ Type I and type II errors ❖ 2-tailed and 1-tailed tests of hypotheses ❖ Hypothesis testing of means when the population standard deviation is known (two-tailed tests of means and one-tailed test of means) ❖ Measuring the power of a hypothesis test ❖ Hypothesis testing of proportions: large samples (two-tailed tests and one-tailed tests of proportions) ❖ Hypothesis testing of means when the population standard deviation is not known (two-tailed tests and one-tailed tests of means using t distribution)	LO – 1 LO – 3 LO – 4	**Text book:** Ch. 8 (Pages 380-417) **Case:** *Quality associates, Inc.* **Case:** *Cutcraft Cutlery Corporation*
11-13	**Testing Hypotheses: Two – sample tests** ❖ Hypothesis testing for differences between means and proportions ❖ Tests for differences between means: large sample sizes ❖ Tests for differences between means: small sample sizes ❖ Testing differences between means with	LO – 1 LO – 4 LO – 5	**Text book:** Ch. 9 (Pages 426-469)

	dependent samples ❖ Tests for differences between proportions: large sample sizes (two-tailed and one-tailed tests) ❖ Prob values		
14-15	**Chi-square test** ❖ Test of independence ❖ Comparing proportions	LO – 1 LO – 6	**Text book:** Ch. 11 (Pages 518-531) **Read:** Chi-square test using SPSS/MS-Excel **Case:** *Airline satisfaction survey*
16-17	**Analysis of variance (ANOVA): One-way** ❖ Between treatments estimate of population variance ❖ Within treatments estimate of population variance ❖ F-test	LO – 1 LO – 6	**Text book:** Ch. 11 (Pages 555-582) **Read:** ANOVA one way using SPSS/MS-Excel **Case:** *Wentworth medical center*
18-20	**Simple Regression and Correlation Analysis** ❖ Introduction (types of relationships, scatter diagrams) ❖ Estimation using the regression line (the method of least squares, the standard error of estimate) ❖ Correlation analysis (the coefficient of determination, the coefficient of correlation)	LO – 1 LO – 7	**Text book:** **Read:** Simple linear regression and correlation using SPSS/Ms-Excel Ch. 12 (Pages 610-657)

* Sessions 1 – 10: Dr. Aman Dua
  Sessions 11-20: Dr. Rajesh Katiyar