

**INTERNATIONAL MANAGEMENT INSTITUTE, BHUBANESWAR**  
**FELLOW PROGRAMME IN MANAGEMENT (FPM)**  
**BUSINESS STATISTICS**  
**CREDIT: FULL (2 CREDITS)**  
**SESSION DURATION: 60 MINUTES**

**TERM: I**  
**YEAR: 2020-2021**  
**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 scholars 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 researcher’s perspective.

**Course Pedagogy:** The sessions will be a blend of interactive lectures and discussions and will be supplemented by cases and exercises. Scholars 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*, 8<sup>th</sup> Edition. Pearson Education, New Delhi.
2. Huff, D. (1993) *How to Lie with Statistics*. W.W. Norton & Company.

A course packet of readings, cases, and data would be provided. For data analysis, the software SPSS would be used. You are requested to upload the software prior to commencement of course.

**Course Evaluation criteria:**

<b>Evaluation component</b>	<b>Weightage</b>	<b>Learning Outcomes</b>
Class participation/Case discussion	20%	LO – 1, LO – 2, LO – 3, LO – 4
Project (Research paper presentation)	20%	LO – 1, LO – 2, LO – 3, LO – 4
Quiz	20%	LO – 1, LO – 2, LO – 3, LO – 4
End-term	40%	LO – 1, LO – 2, LO – 3, LO – 4
<b>Total</b>	<b>100%</b>	

Class participation is based upon your contribution during discussions in the class. You are expected to come prepared to answer the case problems. You may be called upon to speak on the case or the assigned reading material. The assignments will be notified during the course. The end-term examination will be case based.

## Plagiarism

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
1-2.	<b>Introduction to course</b> <b>Frequency Distribution</b> <b>Probability Distribution</b> <ul style="list-style-type: none"> <li>❖ Discrete &amp; continuous random variable</li> </ul>	LO - 1 LO - 2	<b>Textbook:</b> Ch. 3 (Pages 74-134) Ch. 5 (Pages 210-217) Ch. 5 (Pages 225-244) <b>Attempt:</b> Review & application exercises: 3-92 (p. 146), 3-99 (p. 147) Applications: 5-22, 5-26 (p. 236-237)
	<b>Continuous Probability distribution - Normal distribution</b> <ul style="list-style-type: none"> <li>❖ Characteristics of Normal distribution</li> <li>❖ Uses of Normal distribution</li> <li>❖ Standard normal probability distribution</li> </ul>	LO - 1 LO - 2 LO - 3 LO - 4	<b>Textbook:</b> Ch. 5 (Pages 246-263) <b>Attempt:</b> Applications: 5-41, 5-42, 5-46, 5-49 <b>Case:</b> <i>Specialty toys</i>
3-4.	<b>Sampling and sampling distribution</b> <ul style="list-style-type: none"> <li>❖ Sampling error</li> <li>❖ Non-sampling error</li> <li>❖ Sampling distribution of mean</li> <li>❖ Standard error</li> <li>❖ Central Limit Theorem</li> <li>❖ Relationship between sample size and standard error</li> </ul>	LO - 1 LO - 2 LO - 3 LO - 4	<b>Textbook:</b> Ch. 6 (Pages 278-290; 296-316) <b>Attempt:</b> Applications: 6-32, 6-38 (p. 311-312) <b>Case:</b> <i>Acceptable pins</i>
5-7.	<b>Estimation</b> <ul style="list-style-type: none"> <li>❖ Point estimation</li> <li>❖ Interval estimation</li> <li>❖ Confidence interval and confidence level</li> <li>❖ Confidence interval for mean using z-distribution</li> </ul> <b>Testing hypotheses (One sample - large sample)</b> <ul style="list-style-type: none"> <li>❖ Level of significance</li> <li>❖ Type I and type II errors</li> <li>❖ 2-tailed and 1-tailed tests of hypothesis</li> </ul>	LO - 1 LO - 2 LO - 3 LO - 4	<b>Textbook:</b> Ch. 7 (Pages 316-334) Ch. 8 (Pages 366-385) <b>Attempt:</b> 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) <b>Case:</b> <i>Quality associates, Inc.</i>

8-9.	<b>Testing hypotheses (One sample - small sample)</b> <ul style="list-style-type: none"> <li>❖ Confidence interval for mean using t-distribution</li> <li>❖ Degrees of freedom</li> <li>❖ 2-tailed and 1-tailed tests of hypothesis</li> </ul>	LO – 1 LO – 2 LO – 3 LO – 4	<b>Textbook:</b> Ch. 7 (Pages 341-346) Ch. 8 (Pages 397-400) <b>Attempt:</b> 7-41, 7-43 (p. 350), 8-45, 8-47, 8-48, 8-50 (p. 402-403) <b>Case:</b> <i>Cutcraft Cutlery Corporation</i>
10.	<b>Sample size and other concepts</b> <ul style="list-style-type: none"> <li>❖ Sampling procedures</li> <li>❖ Relationship between sample size and standard error</li> <li>❖ Determining the sample size in estimation</li> <li>❖ Concept of p-value</li> <li>❖ Measuring the power of a hypothesis test</li> </ul>	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) <b>Attempt:</b> Applications: SC 8-12 (p. 402), 8-51 (p. 403), 8-53, 8-55 (p. 405-406)
11.	<b>Introduction to SPSS</b>	LO – 3	<b>Data:</b> HBAT
12-13.	<b>Testing hypotheses: Two sample test (Differences of population means)</b> <ul style="list-style-type: none"> <li>❖ Large sample test</li> <li>❖ Small sample test</li> <li>❖ Dependent samples</li> </ul>	LO – 1 LO – 2 LO – 3 LO – 4	<b>Textbook:</b> Ch. 9 (Pages 412-435) <b>Attempt:</b> Applications: 9-2, 9-3 (p. 418); 9-7, 9-8 (p. 429); SC 9-6, 9-17 (p. 438-439) <b>Case:</b> <i>Tiresome Tires – II</i>
14-15.	<b>Chi-square test</b> <ul style="list-style-type: none"> <li>❖ Test of independence</li> <li>❖ Comparing proportions</li> </ul>	LO – 1 LO – 2 LO – 3 LO – 4	<b>Textbook:</b> Ch. 11 (Pages 518-531) <b>Attempt:</b> Applications: 11-7, 11-11, 11-13 (p. 532-533) <b>Case:</b> <i>Airline satisfaction survey</i>
16-17.	<b>Analysis of variance (ANOVA): One-way</b> <ul style="list-style-type: none"> <li>❖ Between treatments estimate of population variance</li> <li>❖ Within treatments estimate of population variance</li> <li>❖ F-test</li> </ul>	LO – 1 LO – 2 LO – 3 LO – 4	<b>Textbook:</b> Ch. 11 (Pages 542-553) <b>Attempt:</b> Applications: 11-27 (p. 564), 11-32, 11-35 (p. 565-566) Applications: 11-60, 11-61 (p. 588) <b>Case:</b> <i>Wentworth medical center</i>
18-20.	<b>Correlation and Regression Analysis</b> <ul style="list-style-type: none"> <li>❖ Estimation using the regression line</li> <li>❖ Correlation analysis</li> <li>❖ Making inferences about population parameters</li> </ul>	LO – 1 LO – 2 LO – 3 LO – 4	<b>Textbook:</b> Ch. 12 (Pages 596-614, 629-638) <b>Attempt:</b> 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) <b>Case:</b> <i>Measuring stock market risk</i>

#Please note CASES/EXERCISES mentioned are tentative. The instructor may provide other cases/exercises as and when needed. For statistical analysis using SPSS data provided will be used.