

## Overview

In the complex and data-driven business environment, effective organizational decision-making must be grounded in sound statistical analyses and research to succeed in a globally competitive world. Business statistics involves collecting, summarizing, analyzing, and reporting numerical findings relevant to a business decision or situation. This module in quantitative research techniques and statistics will provide a complete picture of statistical concepts and their practical applications and demonstrate how statistical methods are vital tools for modern business leaders.

This module is intended as a review of the key concepts, fundamentals, and foundations of the discipline.

## Learners

This module is designed for learners who require an overview of the discipline. The module is commonly used in an academic leveling (transition to graduate education) or business review (capstone) course or program.

## Module Authors

This module is written by Peregrine Global Services, headquartered in Gillette, Wyoming. It includes materials from various sources, as indicated within the module.

## Learning Outcomes

The learning outcomes for the module are as follows. With the completion of this module, learners should be able to:

1. Explain key statistical concepts: the population, the sample, and the statistical inference.
2. Define descriptive and inferential statistics.
3. Describe methods of collecting data.
4. Discuss sampling plans, sampling errors, and non-sampling errors.
5. Describe how to assign probability to events.
6. Explain three rules that are used to calculate the probability of more complex events from the probability of simpler events.

7. Apply Bayes' Law to calculate conditional probability.
8. Recognize the significance of the sampling distribution.
9. Review the concepts of hypothesis testing.
10. Discuss the results of a test of the hypothesis.
11. Describe how to make inferences about the population mean when the population standard deviation is unknown.
12. Explain how to draw inferences about a population variance.
13. Discuss the factors that identify one-way analysis of variance.
14. Recognize the effect on the response variable of two or more factors.
15. Describe the process of selecting one alternative from a list of several possible decisions.
16. Recognize the importance of acquiring, using, and evaluating additional information in decision analysis.

### Curriculum

<u>Section</u>	<u>Topics</u>
Section 1: What is Statistics?	<ul style="list-style-type: none"><li>• Descriptive Statistics</li><li>• Inferential Statistics</li><li>• Key Statistical Concepts</li><li>• Statistical Inference</li><li>• Confidence and Significance Levels</li></ul>

<p>Section 2: Data Collection and Sampling</p>	<ul style="list-style-type: none"> <li>• Methods of Collecting Data</li> <li>• Questionnaire Design</li> <li>• Sampling and Sampling Plans</li> <li>• Sampling Error and Non-sampling Error</li> </ul>
<p>Section 3: Probability</p>	<ul style="list-style-type: none"> <li>• Assigning Probability to Events</li> <li>• Joint, Marginal, and Conditional Probability</li> <li>• Probability Rules and Trees</li> <li>• Bayes' Law</li> <li>• Identifying the Correct Method</li> </ul>
<p>Section 4: Sampling Distributions</p>	<ul style="list-style-type: none"> <li>• Sampling Distribution of the Mean</li> <li>• Sampling Distribution of a Proportion</li> <li>• Sampling Distribution of the Difference Between Two Means</li> <li>• From Here to Inference</li> </ul>
<p>Section 5: Introduction to Hypothesis Testing</p>	<ul style="list-style-type: none"> <li>• Concepts of Hypothesis Testing</li> <li>• Testing the Population Mean When the Population Standard Deviation Is Known</li> <li>• Calculating the Probability of a Type II Error</li> <li>• The Road Ahead</li> </ul>
<p>Section 6: Inference About a Population</p>	<ul style="list-style-type: none"> <li>• Inference About a Population Mean When the Standard Deviation Is Unknown</li> <li>• Inference About a Population Variance</li> <li>• Inference About a Population Proportion</li> </ul>

Section 7: Analysis of Variance	<ul style="list-style-type: none"> <li>• One-Way Analysis of Variance</li> <li>• Multiple Comparisons</li> <li>• Analysis of Variance Experimental Designs</li> <li>• Randomized Block (Two-Way) Analysis of Variance</li> <li>• Two-Factor Analysis of Variance</li> </ul>
Section 8: Decision Analysis	<ul style="list-style-type: none"> <li>• Decision Problem</li> <li>• Acquiring, Using, and Evaluating Additional Information</li> </ul>

### Assessment

The module includes section quizzes and short exercises to ensure understanding of the instructional content. The module also includes a 20-question pre-test and post-test. The pre-test captures the learner’s baseline knowledge, and the post-test ensures that learners have grasped the concepts needed for success.

### Hours and Articulation

Learner hours are shown in the following table. The hours are based on both the time within the module and time away from the module conducting application activities.

<u>Section</u>	<u>Hours</u>
Pre-test	0.25
Section 1: What is Statistics?	0.50
Section 2: Data Collection and Sampling	1
Section 3: Probability	0.5
Section 4: Sampling Distributions	1
Section 5: Introduction to Hypothesis Testing	0.5

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Section 6: Inference About a Population	0.5
Section 7: Analysis of Variance	0.5
Post-test	0.25
<b>Total Hours</b>	<b>5</b>