

# Macao Polytechnic Institute

## School of Business

### Bachelor of Management

#### Module Outline

Academic Year 2020 / 2021 Semester 2

<b>Learning Module</b>	Business Statistics	<b>Class Code</b>	MATH2110-223		
<b>Pre-requisite(s)</b>	Nil				
<b>Medium of Instruction</b>	English	<b>Credit</b>	3		
<b>Lecture Hours</b>	45 hrs	<b>Lab/Practice Hours</b>	0 hrs	<b>Total Hours</b>	45 hrs
<b>Instructor</b>	Dr. Siu Wai Cheong	<b>E-mail</b>	siuwaich@ipm.edu.mo		
<b>Office</b>	M519, Meng Tak Building, Main Campus	<b>Telephone</b>	85993331		

#### Description

This learning module is designed to introduce basic statistical principles, and techniques for data analysis in the context of solving business problems. Students will learn how to perform statistical analysis on various inferential real life situations. Topics include: organizing data; descriptive statistics; probability; discrete distributions; normal distribution; sampling and sampling distributions; estimation; hypothesis testing; correlation and regression analysis.

#### Learning Outcomes

After completing this learning module, students will be able to:

1. Describe the role of statistical analysis in business.
2. Identify the types of data and the various summary measures used to describe data.
3. Describe data in tables and graphs.
4. Apply the binomial, Poisson and normal distributions as a model for data.
5. Apply confidence intervals and test hypotheses for population means and proportions.
6. Use correct data presentation and analysis methods based on problem type and data type.
7. Justify decisions based on statistical significance when faced with variability in data.
8. Analyze relationships between two continuous variables and determine valid prediction models using simple linear regression and correlation.

## Alignment of Program and Module Intended Learning Outcomes

PILOs	CILOs
1. Integrate contemporary management theories and business disciplines relevant to general business practices.	1
2. Apply critical thinking and logical analysis skills and techniques to resolve management issues.	1-8
3. Utilize appropriate written and spoken forms to communicate effectively and professionally with stakeholders in various cultural environments.	N/A
4. Demonstrate leadership in a team and respecting the rights of others irrespective of their cultural background, race or gender in order to solve unpredictable problems in the field.	N/A
5. With the help of mathematical and statistical skills, utilize the latest empirical findings and academic studies to support the recommendation of business projects or reports.	1-8
6. Recommend an appropriate course of action by ethically examining economic, environmental, political, legal and regulatory contexts of global business practices.	N/A
7. Interpret and utilize management information or business software for internal control, planning, performance evaluation, and coordination to improve efficiency and effectiveness in the business process.	N/A

## Content

Topics	Duration
1 The Nature of Statistics 1.1 Two Kinds of Statistics 1.2 Simple Random Sampling <i>(Describe various kinds of statistics and sampling methods.)</i>	1.5 hrs
2 Organizing Data 2.1 Variables and Data 2.2 Organizing Qualitative Data 2.3 Organizing Quantitative Data 2.4 Distribution Shapes <i>(Describe major ways to organize collected data.)</i>	3 hrs
3 Descriptive Measures 3.1 Measures of Center 3.2 Measures of Variation 3.4 The Five-Number Summary; Boxplots 3.5 Descriptive Measures for Populations; Use of Samples	4.5 hrs

	<i>(Describe several measurements used in statistics.)</i>	
4	Probability Concepts 4.1 Probability Basics 4.2 Events 4.3 Some Rules of Probability 4.8 Counting Rules <i>(Explain fundamental concepts of probability.)</i>	3 hrs
5	Discrete Random Variables 5.1 Discrete Random Variables and Probability Distributions 5.2 The Mean and Standard Deviation of a Discrete Random Variable 5.3 The Binomial Distribution 5.4 The Poisson Distribution <i>(Describe various kinds of discrete probability distributions.)</i>	3 hrs
6	The Normal Distribution 6.1 Introducing Normally Distributed Variables 6.2 Areas under the Standard Normal Curve 6.3 Working with Normally Distributed Variables 6.4 Assessing Normality; Normal Probability Plots 6.5 Normal Approximation to the Binomial Distribution <i>(Identify the normal distribution.)</i>	4.5 hrs
7	The Sampling Distribution of the Sample Mean 7.1 Sampling Error; the Need for Sampling Distributions 7.2 The Mean and Standard Deviation of the Sample Mean 7.3 The Sampling Distribution of the Sample Mean <i>(Identify the properties of sample mean and sampling distribution.)</i>	3 hrs
<b>Test 1</b>		1.5 hrs
8	Confidence Intervals for one Population Mean 8.1 Estimating a Population Mean 8.2 Confidence Intervals for One Population Mean When $\sigma$ is Known 8.3 Confidence Intervals for One Population Mean When $\sigma$ is Unknown <i>(Apply the knowledge of sample mean and sampling distribution to construct confidence intervals for population mean.)</i>	3 hrs

9	Hypothesis Tests for One Population Mean 9.1 The Nature of Hypothesis Testing 9.2 Critical-Value Approach to Hypothesis Testing 9.3 <i>P</i> -Value Approach to Hypothesis Testing 9.4 Hypothesis Tests for One Population Mean When $\sigma$ is Known 9.5 Hypothesis Tests for One Population Mean When $\sigma$ is Unknown <i>(Apply the knowledge of sample mean and sampling distribution to test hypotheses for population mean.)</i>	4.5 hrs
10	Inferences for Two Population Means 10.1 The Sampling Distribution of the Difference between Two Sample Means for Independent Samples 10.3 Inferences for Two Population Means, Using Independent Samples: Standard Deviations Not Assumed Equal 10.5 Inferences for Two Population Means, Using Paired Samples <i>(Apply the knowledge of sample mean and sampling distribution to the two-population-means cases.)</i>	3 hrs
12	Inferences for Population Proportions 12.1 Confidence Intervals for One Population Proportion 12.2 Hypothesis Tests for One Population Proportion 12.3 Inferences for Two Population Proportions, Using Independent Samples <i>(Apply the knowledge of sample mean and sampling distribution to the population proportion cases.)</i>	3 hrs
<b>Test 2</b>		1.5 hrs
14	Descriptive Methods in Regression and Correlation 14.1 Linear Equations with One Independent Variable 14.2 The Regression Equation 14.3 The Coefficient of Determination 14.4 Linear Correlation <i>(Apply mathematical techniques to find regression equations and various coefficients in regression and correlation analyses.)</i>	3 hrs
<b>Final Examination</b>		3 hrs
		Total: 45 hrs

### **Teaching Method**

This learning module is primarily conducted by means of class lectures on concepts of statistics. Classwork exercises / assignments and tests will be used to assess students' understanding of the course materials, as well as to monitor students' progress and commitment to the course.

TM1: Statistical knowledge is delivered primarily by lectures with the aid of powerpoint slides.

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TM3: Classwork exercises / assignments will be given.

In order to achieve the outcomes of this learning module, students are expected to perform the following learning tasks:

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### **Attendance**

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### **Assessment**

This learning module is graded on a 100 point scale, with 100 being the highest possible score and 50 the pass score.

	<b>Item</b>	<b>Description</b>	<b>Percentage</b>
1.	Classwork exercises / Assignments	Written assignments.	20%
2.	Tests	2 close book tests.	30%
3.	Final Examination	Close book examination.	50%

**Total Percentage:** 100%

### **Teaching Material(s)**

#### **Textbook(s)**

Neil A. Weiss, 2016, *Introductory Statistics*, 10th Edition (Global Edition), Pearson.

### **Plagiarism Policy**

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