**SYLLABUS**

# Business Statistics

**Name: Business statistics**

**Institution: International Business College, South China Normal University (SCNU)**

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**Dates:**

**Duration: 16 weeks**

**Hours: 64 hours academic classes and seminars**

# Contents



 

# 1. Syllabus content at a glance

This course aims to introduce students to the fundamental statistical concepts that managers commonly use when making decisions as sensible as possible, on the basis of the available evidence. The purpose of this course is to develop statistical thinking that focuses on ways to understand and manage available data and reduces variation of available data. The course will also provide students with the skills and knowledge in the application of statistical analyses and processing of business data.

| **Section** | **Topics** |
|---|---|
| Introduction to Business Statistics | Definition<br>Types of data<br>Data collection and sources |
| Organizing and Presenting Data | Organize data-Frequency distribution<br>Histogram<br>Ogive<br>Visual Representation of Categorical Data |
| Measure of Central Tendencies and Dispersion | Measures of Central Tendencies<br>Non-Central Locations<br>Measures of Variation<br>Shape of a distribution<br>Five – number summary |
| Probability Theory | Basic rules<br>Random Variable and<br>Probability Distribution<br>Binomial Distribution<br>Poisson Distribution |
| Normal Distribution and Sampling Distributions | Normal Distribution<br>Standard normal curve<br>Probabilities of a normal curve<br>Sampling distribution<br>Central limit theorem |
| Estimation | Point estimation<br>Two types of interval estimation<br>Determine the sample size<br>Interval estimation of population proportion |
| Hypothesis Testing | Setting up the hypotheses |

| | |
|---|---|
| | Type of test & test<br>Statistic<br>Critical values<br>Types of errors & level of significance<br>'Z' test for the population mean<br>'t' test for the population mean<br>Decision making using p-value |
| Correlation and Regression Analysis | Scatter diagrams<br>Correlation analysis<br>Simple linear regression Model<br>Testing the coefficients &<br>assessing the model |

# 2. Assessment at a glance

The courses will be assessed by closed tests and assignment.

Midterm closed test 40%.

Final term closed test 50%.

Assignment written group work 10%

The assessment will consist of:

- A test worth 40% of the assessment for the course and held after topic 5. The test will assess the learning outcomes of modules 1 and 2 (topics 1 to 5).

- A group assignment worth 10% of the assessment for the course. It will be due after the completion of all modules of the course.

- An exam worth 50% of the assessment for the course. It will be held at the end of the course. It will assess all learning outcomes of the course, which includes all topics.

- To receive a pass for this course a student must:

  - Pass the final exam and
  - Achieve at least 60% overall.

To successfully complete all the work requirements, students will commit to being:

- responsible for the time management of the work in order to complete all work requirements satisfactorily and on time

- in attendance for classes or alternatively, to establish what they have missed in order to maintain consistent progress

- pro-active in mastering the academic material of the course by challenging, questioning and extending program outcomes

- Responsible for the maintenance of a non-disruptive and scholastic attitude in the learning environment.

# 3. Syllabus aims and assessment objectives

## 3.1 Syllabus aims

This course aims to introduce students to the fundamental statistical concepts that managers commonly use when making decisions as sensible as possible, on the basis of the available evidence. The purpose of this course is to develop statistical thinking that focuses on ways to understand and manage available data and reduces variation of available data. The course will also provide students with the skills and knowledge in the application of statistical analyses and processing of business data. By the end of this course , students can

1. Present and describe information using a range of numerical and graphical procedures.
2. Understand the statistical inference process and apply it for decision making and estimation.
3. Use probability theory and sampling distributions in the statistical inference process
4. Undertake model building and forecasting using regression analysis and time series.
5. Use Microsoft Excel for analyzing data

On successful completion of this course, students will have the statistical abilities to:

- describe the role of statistics in business decision making

- use statistical analysis to prepare short business reports

- use data to inform and support decision making

- use appropriate statistics tools to analyse and interpret data.

The knowledge capabilities listed above are embedded within the learning process of this course, whose aim is for students to develop an understanding of the role and application of statistics in business decision making.

## 3.2 Assessment objectives and their weightings

The three assessment objectives in Business statistics are:

AO1: Knowledge with understanding

AO2: Analysis

AO3: Critical evaluation and decision-making.

## AO1: Knowledge with understanding

Students should be able to:

- show knowledge and understanding of basic definitions, concepts, principles and theories of business statistics
- use statistic vocabulary and terminology
- Use the statistic symbols to indicate the relevant variables

## AO2: Analysis

Students should be able to:

- Collect analyze and organize information
- Present and describe information using a range of numerical and graphical procedures.
- Use the appropriate method to describe the data and find the data pattern
- Apply the statistic method to analyze the business problem in numerical, diagrammatic, graphical form as well as use the formula.

## AO3: Critical evaluation and decision-making

Students should be able to:

- Understand the statistical inference process and apply it for decision making and estimation.
- Use probability theory and sampling distributions in the statistical inference process
- Use sample statistics to estimate and forecast parameter and make the decision.
- Undertake model building and forecasting using regression analysis and time series.
- Use Microsoft Excel for analyzing data

The assessment objectives are weighted to give an indication of their relative importance. The weightings are not intended to provide a precise statement of the number of marks allocated to particular assessment objectives.

# 4. Syllabus content

## 4.1 Introduction to Business Statistics

Students should be able to:

- Define 'statistics'
- Recognize the need for statistics in business
- Differentiate between descriptive and inferential statistics
- Identify different types of data and their sources
- Gain an awareness of different methods of collecting data.

## 4.2 Organising and Presenting Data

Students should be able to:

- To be able to use the appropriate graphical display for the data type: scatter diagram, line graph, pie chart, bar chart, pareto diagram, histogram, ogive.
- To be able to construct stem-and-leaf plots and obtain the 5 figure summary
- To understand the difference between frequency, relative frequency and cumulative frequency in tables and plots
- To use software to produce accurate and informative graphs
- Sources of error in samples and surveys

## 4.3 Measure of Central Tendencies and Dispersion

Students should be able to:

- Understand and be able to calculate measures of central tendency: mean, media, mode
- Understand and be able to calculate measures of spread: standard deviation, range, interquartile range
- Appreciate the effect of data outliers on the various descriptive statistics
- Describe the shape of a distribution of data
- Understand the difference between the formulae for variance of a population and variance of a sample
- Check the values calculated by software against a graph of the data to ensure accuracy
- Understand and calculate standard scores

## 4.4 Probability Theory

Students should be able to:

- Master the methods of calculating probabilities
- Understand rules for probabilities: addition rule, conditional probability, multiplication rule
- Understand the different events in probability

- Calculating mean and variance for discrete probability distributions
- Using the formula to calculate Binomial probabilities
- Using the formula to calculate Poisson probabilities
- Understand and calculate standard scores

## 4.5 Normal Distribution and Sampling Distributions

Students should be able to:

- Understand the concept and characteristics of normal distribution
- Calculate probabilities and inverse probabilities for a Normal random variable.
- Describe central limit theorem and can use it in sampling distribution
- Understand and calculate standard scores
- Describe the characteristics of normal distribution
- Solve problems involving normal distribution
- Solve problems involving Sampling distribution

## 4.6 Estimation

Students should be able to:

- Explain basic estimation processes
- Estimate population parameters such as mean and proportion
- Use confidence interval estimation techniques when $\sigma$ is known &unknown
- Choose the appropriate sample size for estimation purposes

## 4.7 Hypothesis Testing

- Students should be able to:
- Define the principle of statistical inference
- Formulate & distinguish the types of hypotheses
- Recognize different types of errors in hypothesis testing
- Recognize decision making using ‘Z’ test, ‘t’ test and ‘p’ value.

## 4.8 Correlation and Regression Analysis

Students should be able to:

- Measure the strength of association using correlation analysis
- Use Linear Regression models
- Set up the linear regression equation
- Make predictions using the regression equation
- Test goodness of fit of the regression model

# 5. Grade descriptions

Cambridge provides grade descriptions to give a general indication of what a candidate must achieve fora particular grade. The actual grade given to the candidate will depend on how well they have met theassessment objectives overall. A candidate's weakness in one aspect of the exam may be balanced byabove average performance in some other aspect.

## Grade A

To achieve a Grade A, a candidate must show mastery of the syllabus and an outstanding performance on
the more academic problems. Within the separate assessment objectives, a candidate awarded a Grade A
must show:
AO1: Knowledge with understanding
• an excellent ability to identify detailed facts and principles in relation to the content of the syllabus
• an excellent ability to describe clearly graphs, diagrams, tables
• a thorough ability to define the concepts and ideas of the syllabus.
AO2: Analysis
• an excellent ability to classify and comment on information
• an ability to apply this information in a logical and well-structured manner to illustrate the application
of economic analysis to a particular situation.
AO3: Critical evaluation and decision-making
• a thorough ability to classify and order information
• a sound ability to discriminate between varied sources of information and to distinguish clearly between facts and opinions
• a sound ability to make clear, reasoned judgments and to communicate them in an accurate and logical manner.

## Grade C

To achieve a Grade C, a candidate must show a good understanding of the syllabus and some ability to answer questions that are pitched at a more academic level. Within the separate assessment objectives,
a candidate awarded a Grade C must show:
AO1: Knowledge with understanding
• a sound ability to identify detailed facts and principles in relation to the content of the syllabus
• a sound ability to describe clearly graphs, diagrams, tables
• a sound ability to define the concepts and ideas of the syllabus.
AO2: Analysis
• an ability to use and comment on information
• an ability to apply this information to illustrate the application of economic analysis to a

particular situation.
AO3: Critical evaluation and decision-making
• an ability to interpret information accurately
• an ability to discriminate between varied sources of information and to distinguish clearly between facts and opinions
• an ability to evaluate and make reasoned judgments.

### Grade F

To achieve a Grade F, a candidate must show some familiarity with the central concepts and ideas in the syllabus. Within the separate assessment objectives, a candidate awarded a Grade F must show:
AO1: Knowledge with understanding
• some ability to identify specific facts or principles in relation to the content of the syllabus
• some ability to describe graphs, diagrams, tables.
AO2: Analysis
• some ability to classify data in a simple way and some ability to select relevant information from a set of data
• some ability to apply the tools of economic analysis to particular situations.
AO3: Critical evaluation and decision-making
• a limited ability to discriminate between different sources of information and to describe the difference between facts and opinions
• some ability to use information relating to a particular topic.

## 6. Other information

### Language

This syllabus and the associated assessment materials are available in English only.

### Grading and reporting

Performance results are shown by one of the grades A*, A, B, C, D, E, F indicating the standard achieved, A* being the highest and F the lowest. ‘Ungraded’ indicates that the candidate’s performance fellshort of the standard required for grade F. ‘Ungraded’ will be reported on the statement of results but noton the certificate.

### References

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John Croucher. Statistics: Making Business Decision. McGraw-Hill / Irwin,2003.
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http://home.ubalt.edu/ntsbarsh/Business-stat/opre504.htm
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