**MODERN UNIVERSITY FOR BUSINESS & SCIENCE**

**SCHOOL OF HEALTH SCIENCES**

**-SHS-**

**Course Handbook Biostatistics (BIO 202)**

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**I. Important Things to Remember**

 **Make-Up Exam Policy:** Students missing an exam, a quiz or any graded assignment, must submit a **petition** to Students Affairs Office (SAO) within **(7) working days** for review. Note that make-up activities are subject to 10 %-20 % penalty depending on the nature of the excuse. Please email the petition to the respective campus using the following emails:

Beirutpetition@mubs.edu.lb

Aleypetition@mubs.edu.lb

Damourpetition@mubs.edu.lb

 **Attendance & Tardiness Policy:** Attendance is mandatory for all classes and constitutes

5 % of the students’ final grade. Students arriving more than (10) minutes late will be allowed to join the lecture, but no attendance will be awarded.

 **Course Materials & UMS/Moodle:** A course handbook, which includes a course outline, detailing all aspects of each course will be posted on UMS/Moodle. If such file does not exist, please email the corresponding Chair of the Department.

Chair’s email: scharife@mubs.edu.lb (Nursing Department)

ralhalaby@mubs.edu.lb (Nutrition and Dietetics Department)

helballouz@mubs.edu.lb (Optometry and Vision Science)

  **S tud en ts’ E xp ectation s:** Students are expected to have a textbook, and where applicable, a calculator. In addition, students should adhere to the code of conduct set forth by the MUBS administration in the classroom and during examination. ***Please note that cell phone usage is prohibited in the classroom.***

 **Events Participation:** Depending on the nature of the course, students may be required to participate in certain related events. Active participation in these events may affect the students’ final grades positively.

 **Communication with the SHS:** As an SHS student, you can email the SHS for any suggestion, complain, comment, problem, etc. at:

Head of SHS Administration email: rnasr@mubs.edu.lb

Chair’s email: scharife@mubs.edu.lb (Nursing Department)

ralhalaby@mubs.edu.lb (Nutrition and Dietetics Department)

helballouz@mubs.edu.lb (Optometry and Vision Science Department)

 **Student Success Center (SSC):** The Student Success Center (SSC) was established to support the academic, social, psychological, and professional development of students at MUBS. A team of dedicated educators have created student-centered approaches to empower students who experience individual challenges in order to offer them the guidance to overcome any barrier to their progress and success. The offered programs can be tailored to provide direct services by multiple means such as education, counseling, consultation, and advisement based on students’ needs. The objectives of SSC are to: (1) enhance the internal brand name of MUBS and ensure the satisfaction of its stakeholders (2) empower MUBS students to achieve academic excellence and acquire market-based professional skills (3) help students overcome obstacles that could hinder their personal, academic, or career development.

**II. Course Outline**

**Course:** Biostatistics, BIO 202

**Session:** MW 9:00 am-10:30 am

**Textbook(s):**

1- Kuzma, J.W. and Bohenblust, S. E. (2005). *Basic Statistics for the Health Sciences*. Fifth

Edition. New York: McGraw-Hill Companies.

2- Rosner, B. (2016). *Fudamentals of Biostatistics*. Eighth Edition. USA: Cengage

Learning.

**Instructor:** Dr. Nisreen Alwan

**Office Hours:** MW 8:00-9:00 am or by appointment

**Office:** Office 1, SHS, Damour Campus

**Office Extension:** 255

**Email:** nalwan@mubs.edu.lb

**Course Description Prerequisite:** None

The Biostatistics course (3 cr.) presents the basic principles and methods of statistics. It introduces undergraduate students to concepts in statistics and probability, and inferential techniques applied to health sciences and related fields. It provides numerous examples and exercises from health settings. The course begins with descriptive statistics and data summary. Probability and normal distributions are also described. It then proceeds with the basic concepts of hypothesis testing as well as types I and II errors. This paves the way for one-sample and two- sample hypotheses and tests. The course ends with a basic coverage of linear regression and correlation. This course is appropriate to students with basic knowledge in mathematics.

**Course Objectives**

The objective of this course is to introduce the School of Health Sciences students to biostatistical methods and to understand the underlying principles in decision-making for health sciences majors. The course will focus on both descriptive and inferential statistical techniques, with emphasis on selection of appropriate methods and interpretation of results. Students will learn how to apply such concepts and principles using Microsoft Excel and SPSS.

**Learning Outcomes**

At the end of the semester, the students should be able to:

1. Understand and appreciate the role of biostatistics in health sciences.

2. Comprehend and use relevant statistical terminology.

3. Recognize different types and structures of data and be able to summarize and present them in tables and graphs.

4. Describe the basic principles of descriptive and inferential statistics.

5. Calculate standard normal scores and resulting probabilities.

6. Demonstrate an ability to formulate hypotheses, analyze data, and understand and interpret data or results present in literature.

7. Use and apply major statistical methods (t-tests and binomial distribution) necessary to analyze scientific data and make meaningful and valid conclusions.

8. Describe the basic principles of correlation and regression analyses.

9. Build, organize, and analyze data using Microsoft Excel and SPSS.

**Grade Allocation**

Attendance = 5 % Participation = 5 % Portfolio (Multiple submissions-assignments) = 30 % Take-Home Exam = 30 % Final Exam = 30 %

**Grading Scale**

Academic standing at MUBS is based upon the grading system shown below:

|  |  |  |
| --- | --- | --- |
| **Percentage (%)** | **Grade\*** | **Q-Points** |
| 97-100 | A+ | 4.0 |
| 93-96 | A | 4.0 |
| 90-92 | A- | 3.7 |
| 87-89 | B+ | 3.3 |
| 83-86 | B | 3.0 |
| 80-82 | B- | 2.7 |
| 77-79 | C+ | 2.3 |
| 73-76 | C | 2.0 |
| 70-72 | C- | 1.7 |
| 67-69 | D+ | 1.3 |

|  |  |  |
| --- | --- | --- |
| 63-66 | D | 1.0 |
| 60-62 | D- | 1.0 |
| ≤ 59 | F | - |

**\*F- Failing W- Withdrawal I- Incomplete**

**Teaching Methods**

- Interactive and traditional lectures will be used and will be available on Moodle and University

 Management System (UMS).

- Exercises will be solved in class (computer lab) using the board, Microsoft Excel, and SPSS

 during and at the end of each lecture.

- Assignments and exams will be carried out on Moodle using SPSS and Microsoft Excel.

- Blogs with comment functionality to share and discuss information.
-Twitter and course hashtags to encourage open forum and debate.
-Skype to engage more deeply with the material and each other.
-Google Docs, Wikis and other collaborative document tools to store and refine data.
-Project Management Apps to foster and streamline collaboration.
-LinkedIn and other social networks to build connection.
-YouTube to create both course and student presentations.

**Course Plan**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Week** | **Date** | **Topic** | **Chapter(s****)- Textbook** | **Means of****Attainment\*** |
| 1 | 14/10/2019 | Introduction/Statistics and HowThey are Used | 1-1 | A, C, E, ES, P, T |
| 16/10/2019 |
| 2 | 21/10/2019 | Organizing and Displaying Data | 3-11-2 | A, C, E, ES, P, T |
| 23/10/2019 |
| 3 | 28/10/2019 |
| 30/10/2019 |
| 4 | 4/11/2019 | Samples and Populations | 2-16-2 | C, E, ES, P, T |
| 6/11/2019 | Summarizing Data | 4-12-2 | A, C, E, ES, P, T |
| 5 | 11/11/2019 |
| 13/11/2019 |
| 6 | 18/11/2019 | Probability | 5-13-2 | C, E, ES, P, T |
| 20/11/2019 |
| 7 | 25/11/2019 | The Normal Distribution | 6-15-2 | A, C, E, ES, P, T |
| 27/11/2019 |
| 8 | 2/12/2019 | Sampling Distribution of Means andEstimation | 7-16-2 | C, E, ES, P, T |
| 4/12/2019 |
| 9 | 9/12/2019 |
| 11/12/2019 | Introduction to SPSS | - | C, E, ES |
| 10 | 16/12/2019 | One-Sample Significance Testing,Point Estimates, and ConfidenceIntervals | 8-17-2 | A, C, E, ES, P, T |
| 18/12/2019 | **Take-Home Exam (Chapters 1, 2, 3, 4, 5, 6, 7)-Practical** |
| One-Sample Significance Testing,Point Estimates, and ConfidenceIntervals | 8-17-2 | A, C, E, ES, P, T |
| 11 | 23/12/2018 | **Christmas Vacation** |
| 25/12/2018 |
| 12 | 30/12/2019 |
| 1/1/2020 |
| 13 | 6/1/2020 | Two-Sample Significance Testing, | 9-1 | C, E, ES, P, T |

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 8/1/2020 | Point Estimates, and ConfidenceIntervals |  |  |
| 14 | 13/1/2020 |  |  |
| 15/1/2020 | The Chi-Square Test | 12-110-2 | C, E, ES, P, T |
| 15 | 20/1/2020 | The Chi-Square Test | 12-110-2 | C, E, ES, P, T |
| 22/1/2020 | Correlation and Regression | 13-111-2 | C, E, ES, P, T |
| 16 | 27/1/2020 |
| **Final Exam (TBA) (All Chapters)-Practical** |
| \* A: Assignments, C: Class Discussions and Problem Solving, E: Exams, ES: Practice using Excel and SPSS, P: PowerPointPresentation, T: Textbook |

**Important Deadlines**

|  |  |  |
| --- | --- | --- |
| **Assignment** | **Date Handed out to** | **Deadline for Submission** |
| **1** | 30/10/2019 | 4/11/2019 |
| **2** | 18/11/2019 | 22/11/2019 |
| **3** | 28/11/2019 | 3/12/2019 |
| **4** | 18/12/2019 | 6/1/2020 |

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**Classroom Policies**

**Attendance:** Class attendance is mandatory and constitutes 5 % of the final grade. If for some reason a student has to miss class unexpectedly, it is the student’s responsibility to make certain that all assigned work is completed. Excessive absenteeism (more than five absences) will be grounds for disciplinary and corrective actions by the Office of Student Affairs.

<http://www.mubs.edu.lb/en/current-students/policies-procedures/attendance.aspx>

**Participation:** Participation is a necessary part of classroom learning and constitutes 5 % of the final grade. It is not enough to merely attend courses; students must also participate in the learning process. Students are graded on participation separately from attendance, however absence from class deducts from a student’s total participation grade. Likewise, students who do not participate, or those who attend class and cause a disruption, will lose participation points. To fully participate in classes, students should read the chapter prior to the lesson and add positive commentary or questions to the session. Cell phones are strictly forbidden in class and examination rooms, and the use of cell phones constitutes classroom disruption.

**Make-Up Exams:** Exams will be given on the above scheduled dates. However, a make-up exam ***may be given*** by written consent of the Department/School if the student sends an electronic petition within ***7 days*** of the date of the exam. The date of the make-up will be decided by the Department/School concerned as will any penalty is applied toward any exam not taken on the scheduled exam date(s).

<http://www.mubs.edu.lb/en/current-students/policies-procedures/examination-assessment.aspx>

**Academic Integrity and Misconduct:** Plagiarism is defined as the practice of (dishonestly) claiming or implying original authorship of material which one has not actually created. Plagiarism, or any form of cheating, will result in a  **ZERO** for the course. In addition, it is everybody’s responsibility to provide an environment conducive for learning; therefore, mutual respect is required between students and instructors as well as between students themselves. Any notion of misconduct will be reported to the administration and may lead to suspension, probation, or dismissal from the University.

<http://www.mubs.edu.lb/en/current-students/policies-procedures/academic-integrity-plagiarism.aspx>

<http://www.mubs.edu.lb/en/current-students/policies-procedures/student-conduct.aspx>

**Assignments & Projects:** Assignments and projects must be turned in by the  **set due date**. They should be uploaded on UMS/Moodle on the specified date. If you are absent from class, you should call a fellow classmate to find out if there were any assigned exercises during your absence. You are responsible for any and all information given during your absence. Late submission of assignments will be accepted

**only** if notified before the original due date with a valid excuse.

**Go Green:** MUBS is committed to reducing the University’s carbon footprint. Please do not submit hardcopy assignments unless necessary. Make sure that you throw away recyclable items in the allocated recycling bins on campus. Conserve the use of electricity by turning off the light when your leave a

room.

For more information regarding the student code of conduct as well as other related subjects, please check policy on the website:

<http://www.mubs.edu.lb/en/current-students/policies-procedures.aspx>

**III. Students’ Contribution**

Students’ contribution to this course is to:

 Attend all lectures

 Participate in lecture/seminar discussion and activities

 Work individually or in group on assignments requested by the course leader(s)

 Follow-up on sessions by working and practicing exercises using Excel and SPSS

 Access and complete Moodle tests and assignments

 Review tasks by completing further examples not covered in class

**IV. How is the Course Assessed?**

There are **three** assessments for this course:

1. Take-Home Exam (covering chapters: 1, 2, 3, 4, 5, 6, and 7)

2. Final Exam (covering chapters 1, 2, 3, 4, 5, 6, 7, 8, 9, 12, and 13)

3. Assignments (Assignment 1: covering chapters 1 and 3; Assignment 2: covering chapter 4; Assignment 3: covering chapter 6; Assignment 4: covering chapter 8)

Details of the assessments can be found later in this handbook.

***The University regulations on plagiarism and unfair practice must be observed.***

***The SHS reserves the right to ask for further proof of the nature and source of material used and you are advised to keep complete records of such sources.***

**IV.1 Assessment type – Take-Home Exam**

**Word count** – not applicable

**Weighing** – 30 % of final mark for the course

**Due date**: 18-12-2019

**Duration**: 10 hours

**Learning outcomes:**

The student should be able to:

1. Demonstrate a basic understanding of descriptive statistics.

2. Construct a frequency table and indicate the type of graphs for displaying quantitative data.

3. Compute the probability in a given situation.

4. Distinguish between the distribution of a population and the distribution of its sample mean.

5. Interpret the mean and standard deviation in the context of the normal curve, explain the standard score Z, and compute the probability.

**How to prepare yourself for this assessment?**

Students should prepare well for their exam by studying chapters 1, 2, 3, 4, 5, 6, and 7. They should practice exercises and problems using Excel. The instructor will specify some hints regarding the material to be studied and how the students should study.

**Exam structure:**

The exam consists of seven problem-solving questions (Question 1: 42 % of total grade, Question 2: 7 % of total grade, Question 3: 11 % of total grade, Question 4: 14 % of total grade, Question 5: 5 % of total grade, and Question 6: 8 % of total grade, Question 7: 13 %). The exam is over 100 and it will be uploaded on Moodle.

**Marking scheme:**

A detailed key will be presented by the instructor with every exam.

**IV.2 Assessment type – Final Exam**

**Word count** – not applicable

**Weighing** – 30 % of final mark for the course **Due date**: TBA (First week of February) **Duration**: 120 minutes

**Learning outcomes**:

The student should be able to:

1. Demonstrate a basic understanding of a one-sample t-test.

2. Demonstrate a basic understanding of two-samples t-tests.

3. Demonstrate a basic understanding of Chi-square tests.

4. Distinguish between one-tailed and two-tailed tests.

5. Distinguish between correlation analysis and regression analysis.

6. Compute and interpret a regression analysis.

**How to prepare yourself for this assessment?**

Students should prepare well for their exam by studying all chapters. They should practice exercises and problems using Excel and SPSS. The instructor will specify some hints regarding the material to be studied and how the students should study.

**Exam structure:**

The exam consists of six problem-solving questions (Question 1: 12 % of total grade, Question 2: 15 % of total grade, Question 3: 14 % of total grade, Question 4: 20 % of total grade, Question 5: 24 % of total grade, and Question 6: 15 % of total grade). The exam is over 100 and it will be uploaded on Moodle. **Marking scheme:**

A detailed key will be presented by the instructor with every exam.

**IV.3 Assessment type – Assignments**

There are four assignments. They will be uploaded on Moodle.

**Assignments:**

**Word count** – not applicable

**Weighing** – 30 % of final mark for the course grade

**Assignment 1:**

**Date handed out to students:** 30-10-2019

**Due date**: 4-11-2019

**Learning outcomes**:

The student should be able to:

1. Distinguish clearly between

- descriptive and inferential statistics.

- surveys and experiments.

- descriptive and analytical surveys.

- discrete and continuous variables.

- qualitative and quantitative variables.

- measurement scales

2. Construct and interpret frequency and cumulative frequency tables using Excel equations and functions.

3. Indicate and construct the appropriate types of graphs for displaying qualitative and quantitative data using Excel options.

4. Distinguish which forms of data presentation are appropriate for different situations.

**How to prepare yourself for this assignment?**

Students should prepare well for this assignment by studying chapters 1 and 3. The instructor will specify some hints regarding the material to be studied and how the students should study.

**Assignment structure:**

The assignment consists of three parts. Part I consists of several questions dealing with variables, measurement scales, units, and sample size (25 % of total grade). Part II consists of one problem-solving question including plotting (65 % of total grade). Part III consists of four multiple choice questions

dealing with types of graphs (10 % of total grade). The assignment is over 40 and it will be done on

Excel.

**Marking scheme:**

A detailed key will be presented by the instructor with every assignment.

**Assignment 2:**

**Date handed out to students:** 18-11-2019

**Due date**: 22-11-2019

**Learning outcomes**:

The student should be able to:

1. Compute and distinguish between the uses of measures of central tendency using Excel options, equations, and functions.

2. Compute and distinguish between the uses of measures of variation using Excel options, equations, and functions.

**How to prepare yourself for this assignment?**

Students should prepare well for this assignment by studying chapter 4. The instructor will specify some hints regarding the material to be studied and how the students should study.

**Assignment structure:**

The assignment consists of one problem. The assignment is over 20 and it will be done on Excel.

**Marking scheme:**

A detailed key will be presented by the instructor with every assignment.

**Assignment 3:**

**Date handed out to students:** 28-11-2019

**Due date**: 3-12-2019

**Learning outcomes**:

The student should be able to:

1. Demonstrate an understanding of the normal distribution and its importance.

2. Identify the properties of the normal distribution.

3. Interpret the mean and the standard deviation in the context of the normal curve.

4. Explain and compute the standard score Z.

5. Compute the proportion and percentage of areas above, below, or between given points under a normal curve.

**How to prepare yourself for this assignment?**

Students should prepare well for this assignment by studying chapter 6. The instructor will specify some hints regarding the material to be studied and how the students should study.

**Assignment structure:**

The assignment consists of four questions. Question 1 consists of a problem dealing with calculating proportion above a given point under a normal curve (17.14 % of total grade). Question 2 consists of a problem dealing with calculating proportion between given points under a normal curve (28.57 % of total grade). Question 3 consists of a problem dealing with calculating proportion below a given point under a normal curve (20 % of total grade). Question 4 consists of a problem dealing with calculating proportions between given points under a normal curve (34.29 % of total grade). The assignment is over

35 and it will be done on Excel.

**Marking scheme:**

A detailed key will be presented by the instructor with every assignment.

**Assignment 4:**

**Date handed out to students:** 18-12-2019

**Due date**: 6-1-2020

**Learning outcomes**:

The student should be able to:

1. Outline and explain the procedure for a test of significance.

2. Explain the meaning of a null hypothesis and an alternate hypothesis.

3. Define statistical significance.

4. Find the value of Z or t corresponding to a specified significance level, α.

5. Distinguish between a one-tailed and a two-tailed test.

6. Distinguish between the critical value and test statistic.

7. Determine when to use a Z test and when to use a t test.

**How to prepare yourself for this assignment?**

Students should prepare well for this assignment by studying chapter 8. The instructor will specify some hints regarding the material to be studied and how the students should study.

**Assignment structure:**

The assignment consists of 5 exercises (Exercise: 36 % of total grade; Exercise 8.1: 12 % of total grade; Exercise 8.22: 14 % of total grade; Exercise 8.26: 16 % of total grade; Exercise 8.28: 22 % of total grade). Exercise 8.1 deals with stating the null and alternate hypotheses. The remaining exercises are related to computing Z or t values, defining statistical significance, and distinguishing between one- tailed and two-tailed tests. The assignment is over 50 and it will be done on Excel and SPSS.

**Marking scheme:**

A detailed key will be presented by the instructor with every assignment.

**V. Assessment Criteria**

The assessment criteria represent an indication of the academic characteristics that the assessments will be required to have satisfied in order to be awarded the grade indicated.

**A (90% +)** Excellent performance relative to designated learning outcomes. Demonstrates excellent understanding of the subject matter covered in the assessment. Demonstrates a high degree of analytical ability, originality and critical insight using a wide range of sources and literature. Demonstrates a very high level of comprehension of relevant academic content and shows clear evidence of appreciating its professional application. The work demonstrates an exceptional grasp of relevant theory and a rigorous application.

**B (80-89%)** Very good performance relative to designated learning outcomes. Demonstrates broad understanding of the subject matter covered in the assessment. Demonstrates solid analytical ability and a good grasp of the relevant academic content and its application. Demonstrates good powers of critical thought.

**C (70-79%)** Good performance relative to designated learning outcomes. Demonstrates understanding of the subject matter covered in the assessment. Demonstrates knowledge of the material provided. There may be some isolated deficiencies in knowledge and understanding.

**D (60-69%)** Satisfactory performance in designed learning outcomes. Demonstrates a basic understanding of the subject matter covered in the assessment. Shows comprehension of the basic facts and principles but may present some notable deficiencies in knowledge and understanding.

**F (59% & below)** There is an attempt to address the question but no real evidence of any specific structure. There is confusion in the material addressed, leading to a less than satisfactory answer.