BRAC
UNIVERSITY

Inspiring Excellence

Department of Mathematics and Natural Sciences
Summer 2023

STA101	Introduction to Statistics	3 credits

Course Introduction:

This course provides an introduction to the theory and practice of basic statistics in the context of business fields, life science and others discipline. We want to show how statistics is relevant to real life. We will teach elementary concepts of statistics using the medium of the bio science, sports and stock market. Since most of the students are from life science, business & economics students, this will be highly relevant to them. The emphasis is on applications, rather than proofs, but some understanding of the concepts and an ability to communicate the meaning of the results is vital. However, a student can never expect to be an effective analyst without attaining due skills of statistics. It aims to enhance a student's abilities to reason both quantitatively and logically.

Course Objective

The main objective of the course is to make familiar with the basic concepts of statistics and its applications for life science, business, economics and others discipline students. We will introduce with the application of statistics. Attempts will be made to provide a clear, concise understanding of the fundamental features and methods of statistics along with relevant interpretations and applications for conducting quantitative analyses. This course will help students to develop skills in thinking and analyzing a wide range of problem in the field of bio science, business, economics other disciplines from a probabilistic and statistical point of view.

Course Prerequisite: NA

Course Learning Objectives (CLO) At the end of this course, students will be able to:

CLO1: Develop fundamental concepts of probability and statistics commonly used in Life science, Business, Economics and other fields.

CLO2: Evaluate elementary concepts of statistics using the medium of the bio data, sports, stock Market etc.

CLO3: Perform statistical computations & interpret the outcomes effectively.

CLO4: Develop probabilistic and statistical models for some applications, and apply Forecasting methods to a range of problems in bio science, business and other relevant fields.

CLO5: Comprehend the theoretical foundations that leads to choosing the appropriate analysis.

Required Text: Statistical Techniques in Business and Economics- Douglas A Lind, William G. Marchal & Samuel A. Wathen.

Other Recommended Books:
1. Statistics for Business and Economics- David R. Anderson, Dennis J. Sweeney & Thomas A. Williams
2. A First Course in Probability- Sheldon M. Ross

Format and Procedures:
- This course is designed for active engagement. Every class will start with a <u>discussion (10 minutes) on the previous lecture</u> followed by explaining unresolved questions and homework.
- There will be an <u>hour-long lecture</u> by the faculty.
- At the end of the lecture, the faculty will spend <u>5 minutes discussing the probable questions</u> one may have on the issues.
- There will be <u>up to three quizzes in a semester</u>.
- Slack / Google Drive will be used as a platform for teaching and learning materials & communication section-wise.

General rules to be followed:
- Students are expected to show mutual respect and remain silent while their colleagues are discussing any issues in the class.
- <u>Class attendance is mandatory and marked</u>.
- If any student **fails to show up in four classes in a row s/he will be barred from the class**.
- If any student is sick or has a major family problem s/he must notify his/her class instructor.
- Students are expected to **make appointments via email** before they show up for consultations.
- <u>In case of urgent matters, SMS/Email can be used to approach the faculty.</u>

Marks Distribution of the Course:

Table: Performance Evaluation

Criteria	Indicators for Learners
FORMATIVE	
Point 1	Class attendance
Point 2	Quiz
Point 3	Assignments/ Problem sets
Point 4	Term paper/ Project
SUMMATIVE	
Point 5	Midterm
Point 6	Final examination

NOTE: **Class attendance is compulsory for every student.** 5% of total marks in every course will be allocated for attendance. The basis for awarding marks for attendance is as follows:

Table: Assessment Rubric

Criteria	** Weightage in Percentage
Point 1	05%
Point 2	20%
Point 3	15%
Point 4	---
Point 5	25%
Point 6	35%
Total	100%

- **Attendance Marks:**

Attendance Percentage	Marks
90% and above	5
85% to less than 90%	4
80% to less than 85%	3
75% to less than 80%	2
70% to less than 75%	1
Less than 70%	0

NOTE: If the student does not attend a minimum of **70%** of the total classes, a student will not be allowed to take the final exam.

- **Final Examination:**

The duration of the final examination will be *1.5 hours* and it will be held *according to the schedule provided in USIS*. Further instruction about question setting and other relevant issues will be given later.

- **Midterm:**

Midterm will be held during the midterm week *July 15, 2023 to July 23 according to the university provided schedule*. There will be *no makeup midterm*, unless any student *submits application* through the corresponding chair of the department *before* the midterm's scheduled date. *Syllabus of the midterm* will be announced later.

- **Quizzes:**

There will be *3 quizzes*. Each quiz will be of 20 marks. The average of best *2 quizzes* will be counted for final grading. Remember there will be no makeup quiz. Syllabus of respective quiz will be given prior to that quiz. Duration of each quiz will be *50-60 minutes*.

- **Assignments/ Problem Sets:**

Assignments/ Problem sets will be given to enhance the student's ability to adapt with the subject. A total of 5 (five) assignments will be assigned throughout the semester. Average scores of all the assignments will be counted. Total marks allocated for assignment is 15.

Grading policy: Your grade will be calculated using the BRAC University grading formula as follows:

Numerical Scores	Letter Grade	Grade Points
97 to ≤ 100	A+ (Exceptional)	4.0
90 to < 97	A (Excellent)	4.0
85 to < 90	A-	3.7
80 to < 85	B+	3.3
75 to < 80	B (Good)	3.0
70 to < 75	B-	2.7
65 to < 70	C+	2.3
60 to < 65	C (Average)	2.0
57 to < 60	C-	1.7
55 to < 57	D+	1.3
52 to < 55	D (Poor)	1.0
50 to < 52	D-	0.7
< 50	F (Failure)	0.0

Instructions to the students from the course teacher:

- There will be no **makeup quizzes.**
- Makeup exams are highly discouraged. But make up exams can be permitted under compelling situations as per Brac University rules.
- No student will be allowed to sit for the final exam if **he/she misses 30% of the total classes.**
- Each student **must attend** the **first and last class** of the course according to the course plan.
- The student will find supporting documents at the <u>respective channel of relevant faculty members.</u>

Lesson Plan: Detail syllabus with tentative lesson plan. However, topics may be changed if necessary

Week	Lecture	Topics to be covered	Assignment
1	1	Introduce with Statistics, Definition and Scope of Statistics.	1st
	2	Sources of Data, Variables, Classification of variable, Level of Measurements.	
2	3	Data Summarization & Data visualization (Qualitative)	
	4	Data visualization (Quantitative)	
3	5	Measure of Central Tendency & Position for raw data	2nd
	6	Measure of Central Tendency & Position for group data	
4	7	**Quiz-1** [1st quiz will be taken based on lectures 1 to 6]	
	8	Measures of Dispersion for raw data with interpretation.	
5	9	Measures of Dispersion for group data with interpretation.	3rd
	10	Measures of Shape Distribution	
6	11	**Quiz-2** [2nd quiz will be taken based on lectures 8 to 11]	

Week	Lecture	Topics to be covered	Assignment
	12	Exploratory Data Analysis	
7		**Midterm Examination** [Midterm will be taken based on lectures 1 to 11]	4th
8	13	Basic concepts of set and Probability, Uses of Venn Diagram, Terminologies & Approaches of Probability	
	14	Laws of Probability & Conditional Probability	
9	15	Bi-variate data, Scatter Diagram, Correlation Analysis, Coefficient of Correlation with	
	16	Regression Analysis, Applications, Regression Line	5th
10	17	Regression Coefficients with interpretation, coefficient of determination with interpretation, Examples.	
	18	Time Series Analysis	
11	19	**Quiz-3** [3rd quiz will be taken based on lectures 13 to 18]	
	20	Moving Average Method	
12	21	Simple and Weighted Price Index	
	22	Consumer price Index and its applications	
13	23	Introduction to Sampling	
	24	Different Sampling Techniques	
		Final Examination [Final exam will be taken based on lectures 12 to 24]	

NOTE: *There may be changes in the plan, if necessary, according to the circumstances of the term.*