**ALLAMA IQBAL OPEN UNIVERSITY ISLAMABAD**

**(Department of Business Administration)**

**WARNING**

1. **PLAGIARISM OR HIRING OF GHOST WRITER(S) FOR SOLVING THE ASSIGNMENT(S) WILL DEBAR THE STUDENT FROM THE AWARD OF DEGREE/CERTIFICATE IF FOUND AT ANY STAGE.**
2. **SUBMITTING ASSIGNMENTS BORROWED OR STOLEN FROM OTHER(S) AS ONE’S OWN WILL BE PENALIZED AS DEFINED IN THE “AIOU PLAGIARISM POLICY”.**

**Course: Applied Math for Business & Social Sciences (8405)**

## Level: BBA (4 years) Semester: Spring, 2025

## Please read the following instructions for writing your assignments. (AD, BS, B. Ed, MA/MSc, MEd) (ODL Mode).

1. All questions are compulsory and carry equal marks but within a question the marks are distributed according to its requirements.

2. Read the question carefully and then answer it according to the requirements of the questions.

3. Avoid irrelevant discussion/information and reproducing from books, study guide or allied material.

4. Handwritten scanned assignments are not acceptable.

5. Upload your typed (in Word or PDF format) assignments on or before the due date.

6. Your own analysis and synthesis will be appreciated.

7. Late assignments can’t be uploaded at LMS.

8. The students who attempt their assignments in Urdu/Arabic may upload a scanned copy of their handwritten assignments (in PDF format) on University LMS. The size of the file should not exceed 5MB.

**Total Marks: 100 Pass Marks: 50**

**ASSIGNMENT No. 1**

***Note: All questions carry equal marks.***

Q. 1 A company’s total profit for a product is modelled by the quadratic equation

P(x) = −2x2+8x−3, where x is the number of units sold (in thousands). Determine the number of units that will maximize the profit and find the maximum profit.**(20)**

Q.2 A candidate for the position of governor of a midwestern state has an advertising budget of $1.5 million. The candidate's advisors have identified four advertising options: newspaper advertisements, radio commercials, television commercials, and billboard advertisements. The costs for these media options average $1,500, $2,500, $10,000, and $7,500, respectively. If xj​ equals the number of units purchased of media option j:  **(20)**

1. Write an equation which requires total advertising expenditures of $1.5 million.
2. If it has been determined that 100 newspaper ads, 300 radio ads, and 50 billboard ads will be used, how many television ads can they purchase

Q. 3 Three products, A, B, and C, require the following resources: (**20)**

* Product A: 1 unit of material X, 2 units of material Y
* Product B: 2 units of material X, 1 unit of material Y
* Product C: 3 units of material X, 3 units of material Y

If a company has 10 units of material X and 12 units of material Y, how many of each product can it produce? Use the Gaussian elimination method to solve.

Q. 4 Determine the solution set for the following system of equations**. (20)**

x1 + x2 + x3 = 0

3x1 – x2 +2x3 = -1

x1 +2x2 +3x3 = -5

Q.5 In a four-cylinder engine there are four spark plugs. If any one of them malfunctions, the car will idle roughly and power will be lost. Suppose that for a certain brand of spark plugs the probability that a spark plug will function properly after 5,000 miles is 0.90. Assuming that the spark plugs operate independently, what is the probability that the car will idle roughly after 5,000 miles? **(20)**

**Total Marks: 100 Pass Marks: 50**

### ASSIGNMENT No. 2

This assignment is a research-oriented activity. You are required to select one of the following topics according to the last digit of your roll number. For example, if your roll number is D-3427185 then you will select topic number 5 (the last digit). Visit any business/commercial organization and write a paper of about 1000 words on the topic allotted to you. Prepare two copies of this report; submit one copy to your tutor for evaluation and use the other for presentation in the workshops, which will be held at the end of the semester prior to your final examination.

1. Solving First-Degree and Second-Degree Equations: Practical Applications
2. Graphing Linear Equations: Slope-Intercept and Beyond
3. Gaussian Elimination Method for Solving Multi-Variable Systems
4. Understanding the Domain and Range of Mathematical Functions
5. Break-Even Models: Linking Cost, Revenue, and Profit Functions
6. Exploring Characteristics of Exponential and Logarithmic Functions
7. Finding Optimal Solutions Using Linear Programming
8. Basic Probability Concepts: Events, Outcomes, and Rules
9. The Normal Probability Distribution and Its Applications
10. Bernoulli Processes and the Binomial Distribution in Probability

**The report should follow the following format:**

1. Title page
2. Acknowledgements
3. An abstract (one-page summary of the paper)
4. Table of contents
5. Introduction to the issue (brief history & significance of issue assigned)
6. Practical study of the organization (for the issue)
7. Data collection methods
8. SWOT analysis (strengths, weaknesses, opportunities & threats) relevant to the issue assigned
9. Conclusion (one-page brief covering important aspects of your report)
10. Recommendations (specific recommendations relevant to the issue assigned)
11. References (as per APA format)
12. Annexes (if any)

**GUIDELINES FOR ASSIGNMENT # 2:**

* 1.5 line spacing
* Use headers and subheads throughout all sections
* Organization of ideas
* Writing skills (spelling, grammar, punctuation)
* Professionalism (readability and general appearance)
* Do more than repeat the text
* Express a point of view and defend it.

###### APPLIED MATH FOR BUSINESS & SOCIAL SCIENCES

**COURSE OUTLINE (8405)**

**Unit No.1: Preliminaries**

1. Solving First-Degree Equations in One Variable
2. Solving Second-Degree Equations in 'One Variable
3. Inequalities and Their Solution
4. Absolute Value Relationships
5. Some Properties of Absolute. Values
6. Solving Equations and Inequalities Involving Absolute Values
7. Rectangular Coordinate Systems

**Unit No.2: Linear Equations**

1. Characteristics of Linear Equations.
2. Linear Equations with n Variables
3. Graphical Characteristics
4. Graphing Two-Variable Equations
5. Slope-Intercept
6. Determining the Equation of a Straight Line

**Unit No.3: Linear Equations Involving More than Two Variables**

1. Three-Dimensional Coordinate Systems.
2. Equations Involving Three Variables
3. Equations Involving More than Three Variables
4. Gaussian Elimination Method
5. Graphical Analysis for Three-Variable Systems
6. Gaussian Elimination Procedure for (3 X 3) Systems

**Unit No.4: Mathematical Functions**

1. Functions
2. The Nature and Notation of Functions
3. Domain and Range Considerations
4. Restricted Domain and Range
5. Multivariate Functions
6. Types of Functions

**Unit No.5: Linear Functions: Application**

1. General Form and Assumptions
2. Linear Cost Functions
3. Linear Revenue Functions
4. Linear Profit Functions
5. Break-Even Models
6. Quadratic! Functions and Their Characteristics
7. Polynomial Functions
8. Rational Functions

**Unit No.6: Exponential & Logarithmic**

1. Characteristics of Exponential Functions
2. Base-e Exponential Functions
3. Conversion to Base-s Functions
4. Logarithms and Logarithmic Functions

**Unit No.7: Linear Programming**

1. Structural Constraints\_ and No Negativity Constraints
2. Graphical Solutions
3. The Graphics of Linear Inequalities
4. Systems of Linear Inequalities
5. Region of Feasible Solutions
6. Incorporating the Objective Function
7. Comer-Point Solutions
8. Alternative Optimal Solutions
9. No Feasible Solution
10. Unbounded Solutions

**Unit No.8: Introduction to Probability**

1. Introduction to Sets and Set Operations
2. Permutations and Continuations
3. Basic Probability Concepts
4. Experiments, Outcomes, and Events
5. Probabilities
6. Some Additional Rules of Probability
7. States of Statistical Independence and Dependence

**Unit No.9: The Normal Probability Distribution**

1. Random Variables and Probability Distributions
2. Random Variables
3. Frequency Distributions
4. Probability Distributions
5. Histograms
6. Measure of Central Tendency and Variation
7. The Binomial Probability Distribution
8. Bernoulli Processes
9. The Binomial Distribution