MZO-006

ASSIGNMENT BOOKLET

M.Sc. (Zoology) Programme

(MSCZOO)

Biostatistics and Bioinformatics

Valid from 1ˢᵗ January, 2025 to 31ˢᵗ December, 2025

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THE PEOPLE'S
UNIVERSITY

School of Sciences
Indira Gandhi National Open University
Maidan Garhi
New Delhi-110068

(2025)

Dear Student,

Please read the Section on assignments in the Programme Guide for M.Sc. (Zoology). A weightage of 30 per cent, as you are aware, has been earmarked for continuous evaluation, which would consist of one tutor-marked assignment for this course. The assignment is in this booklet. The total marks for this assignment is 100, of which 40 marks are needed to pass it.

Instructions for formatting your Assignments

Before attempting the assignment please read the following instructions carefully:

1) On top of the first page of your answer sheet, please write the details exactly in the following format:

ROLL NO.: …………………………………………

NAME: …………………………………………..

ADDRESS: …………………………………………

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COURSE CODE: ………………………….
COURSE TITLE: ………………………….
ASSIGNMENT NO.: ………………………….…
STUDY CENTRE: ………………………..…....
DATE: …………………….………………...

PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE EVALUATION AND TO AVOID DELAY.

2) Use only foolscap size writing paper (but not of very thin variety) for writing your answers.

3) Leave 4 cm margin on the left, top and bottom of your answer sheet.

4) Your answers should be precise.

5) Solve this assignment, and **submit the complete assignment answer sheets within the due date.**

6) The assignment answer sheets are to be submitted to your Study Centre within the due date. **Answer sheets received after the due date shall not be accepted. We strongly suggest that you retain a copy of your answer sheets.**

7) This assignment is valid from 1st January, 2025 to 31st December, 2025. If you have failed in this assignment or fail to submit it till its validity, then you need to get the assignment for the next year and submit it as per the instructions given in the Programme Guide.

8) **You cannot fill the examination form for this course** until you have submitted this assignment.

We wish you good luck.

ASSIGNMENT

Note: Attempt all questions. The marks for each question are indicated against it.

1. a) Define the term "arithmetic mean". Discuss how to calculate it for ungrouped data using the direct method. (5)

    b) What is dispersion, and explain its importance in statistical analysis. (5)

2. Differentiate between the following pairs of terms: (2 ½× 4= 10)

    a) Geometric mean and Harmonic mean

    b) Positive Correlation and Negative Correlation

    c) Global alignment and Local alignment

    d) PAM and BLOSUM

3. Write short notes on the following: (2 ½× 4= 10)

    a) Importance of hypothesis testing

    b) Poisson distribution

    c) Artificial Neural Network for protein prediction

    d) Significance of sequence alignment

4. a) Explain the importance of nucleotide databases in molecular biology and bioinformatics. (5)

    b) What is the FASTA file format, and how is it structured? (5)

5. Elaborate on the principles of classification, which include class limits, class intervals, range and class frequency and explain how these things are applied in biostatistical data analysis. (10)

6. a) Explain how the C /C++ programming languages are used in BLAST and SAMTools. (5)

    b) Discuss the significance of RNA secondary structure prediction and compare the tools Mfold and RNAfold. (5)

7. a) What is the p-value, and how is it used in hypothesis testing? (5)

    b) Define the term "Binomial distribution". Discuss with a suitable example. (5)

8. a) Discuss the advantages and disadvantages of Spearman's rank correlation coefficient. (5)

    b) Discuss the merits and demerits of standard deviation compared to variance. (5)

9.   a)   Explain the steps involved in bootstrap analysis with an example.   (5)

      b)   Describe the steps for predicting β-sheets using the Chou-Fasman method.   (5)

10.   What is the principle of microarray? Describe the steps involved in designing a microarray, including probe design, array fabrication, sample labeling, hybridisation and scanning.   (10)

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