ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD

(Department of Statistics)

WARNING

1. **PLAGIARISM OR HIRING OF GHOST WRITER(S) FOR SOLVING THE ASSIGNMENT(S) WILL DEBAR THE STUDENT FROM 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 "AIOU PLAGIARISM POLICY".**

Course: Statistics (794) **Semester: Autumn, 2025**
Level: MSc Forestry Extension

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 may be distributed according to its requirements.
2. Read the question carefully and then answer it according to the requirements of the question.
3. Avoid irrelevant discussion/information and reproducing from books, study guides, 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 to the LMS.
8. The students who attempt their assignments in Urdu/Arabic may upload a scanned copy of their handwritten assignments (in PDF format) on the University LMS. The size of the file should not exceed 5MP.

Total Marks: 100 **Pass Marks: 40**

ASSIGNMENT No. 1
(Units 1-5)

Q. 1 (a) What is meant by a frequency distribution? Describe briefly the main steps in the construction of a frequency table.

(b) Prepare a frequency table for the price (Rs/Kg) data given below. Calculate the different types of averages and standard deviation, both by ungrouped data as well as by grouped data. (20)

100	96	92	88	86	84	82	80	78	91	87	83	79	77	75	73	71	69	58	56	73	50	57	55	53	51	
48	46	63	59	55	51	49	47	45	43	41	58	54	50	56	44	42	40	38	36	46	53	50	43			

Q. 2 (a) Explain the ten properties of a normal distribution.

(b) A company produces light bulbs whose life follows a normal distribution with a mean of 1300 hours and a standard deviation of 50 hours. If we chose a light bulb randomly

(*i*) What is the probability that its lifetime will be less than 1500 hours?

(*ii*) What is the probability that its lifetime will be more than 1850 hours?

(*iii*) What is the probability that its lifetime will be between 1280 and 1740 hours? (10+10)

Q. 3 (a) Differentiate between type-one and two errors in testing hypotheses.

(b) A firm took a random sample of 12 homes and found that the average appraised market value was Rs780,000 and the standard deviation was Rs 49,000. Test the hypothesis that for all homes in the area, the mean appraised value is Rs 825,000. Use the 0.05 level of significance. (10+10)

Q. 4 **(**a**)** An auto company decided to introduce a new six-cylinder car whose mean petrol consumption is claimed to be lower than that of the existing auto engine. It was found that the mean petrol consumption for the 50 cars was 10 km per liter with a standard deviation of 3.5 km per liter. Test at 5% level of significance, whether the claim of the new car's petrol consumption is 9.5 km per liter on average is acceptable.

(b) A manufacturer of ball pens claims that a certain pen he manufactures has a mean writing life of 400 pages with a standard deviation of 20 pages. A purchasing agent selects a sample of 100 pens and puts them on for testing. The mean writing life for the sample was 390 pages. Should the purchasing agent reject the manufacturer's claim at 1% level? (10+10)

Q. 5 a) What is a linear regression model? Explain the assumptions underlying the linear regression model.

b) Find the product-moment coefficient of correlation between X and Y. Also, find the coefficient of determination and interpret it.

X	30	35	40	45	50	60	70	80	90	95
Y	2	4	5	5	8	15	24	30	32	40

(10+10)

Total Marks: 100 **Pass Marks: 40**

ASSIGNMENT No. 2
(Units 6-9)

Q.1 a) Explain the difference between i) Probability and Non-probability sampling ii) Sampling with and without replacement

b) Write down the general procedure for testing the Hypothesis in detail. (20)

Q.2 Five fertilizers A, B, C, D and E are tested in a Latin Square Design. The layout of the design is as given in the following table. (20)

Rows	**Columns**				
	1	2	3	4	5
1	B 5.6	D 5.2	E 3.3	A 9.3	C 13.4
2	C 6.8	A 3.0	B 6.00	E 5.0	D 5.0
3	D 8.2	C 15.2	A 8.4	B 6.1	E 4.6
4	E 5.2	B 7.2	C 14.1	D 8.4	A 6.9
5	A 9.2	E 6.3	D 11.8	C 15.6	B 7.6

Analyze the data for evidence at the 5% level of significance that the mean yields are not equal for the five fertilizers. Also, pick out the best fertilizer.

Q.3 Elaborate on the merits, demerits and uses of factorial designs. How would you analyze the data by using a three-factor factorial experiment? (20)

Q. 4 The following data were obtained from a 2^3-factorial experiment repeated three times

Replication	Treatment combinations							
	(1)	a	b	ab	c	ac	bc	abc
1	12	15	24	23	17	16	24	28
2	19	20	16	17	25	19	23	25
3	10	16	17	27	21	19	29	20

Set up an analysis of variance to test the significance of main effects and interactions. (20)

Q. 5 (a) Explain the covariance model and its assumptions.

(b) Each of 4 blocks was divided into 3 plots, and 3 different treatments A, B, C were distributed at random among the plots of each block. The rows correspond to blocks and the yields of the grain and straw were denoted by X and Y, respectively. Examine the covariance between the yields of

grain and straw to show whether the yield of straw after correction for the yield of grain varies significantly with treatment. [5+15]

Blocks	Treatments					
	A		B		C	
	X	Y	X	Y	X	Y
1	65	32	75	38	72	33
2	68	26	54	20	69	30
3	71	26	71	28	69	38
4	62	33	64	29	61	30