Department of Horticulture

College of Agriculture Engineering Sciences

Salahaddin University - Erbil

Subject: Principles of Statistics

Course Book: For 1st Year Students

Lecturer's name: Shiraz Abdulkhaliq Abdullah

Academic Year: Spring Semester 2022-2023

Course Book

1. Course name	Principle of Statistics
2. Lecturer in charge	Shiraz Abdulkhaliq Abdullah
3. Department/ College	Department of Horticulture College of Agriculture Engineering Sciences
4. Contact	e-mail: shiraz.abdullah@su.edu.krd
5. Time (in hours) per week	Theory: 2 Practical: 3
6. Office hours	10 hrs. weekly
7. Course code	
8. Teacher's academic profile	https://academics.su.edu.krd/shiraz.abdullah
9. Keywords	Statistics, Data presentation, Variables, Statistical Measures, Hypothesis tests. T-test,…

10. Course overview:

   The intent of this course is to give students a basis in statistical literacy through a study of some of the basic statistical techniques and approaches. It's an introductory college level Statistics course in which students will develop a basic understanding of statistical concepts, deals to study and build skills through investigations of different ways to collect and represent data and to analyze then interpret variation in data. The course consists of 13 lectures; each lectures includes suggested times for how long it may take to complete all of the required activities, these times are approximate. Some activities may take longer. (at least two and a half hours for each lectures).

11. Course objective:

Statistics uses in different sciences especially in agricultural sciences, which include two type experiments (Laboratory and Field), how it analyses and what the differences are.

Studying Statistics to learn basic terminologies, collect and methods of data presentations, interpretation of data and comparison between groups of data by using suitable test, step by step how to apply these tests of significance.

In agriculture by completing this course the student will learn to perform to calculate and apply measures of location (measures of central tendency) and dispersion (variability) after that they get to know the data distributions, perform test of hypothesis and samples comparison (two sets data that collect) to make decisions.

We almost trying to teach students how to use computer software to enter data, present and create different graphs and analyze it by using statistical package in future if we have computer lab.

Precondition for successful course completion: Basic knowledge of MS Excel

12. Student's obligation

1- Attendance and participation in arguments.

2- turned off cell phones

3- The necessity to use a calculator

4- Completion of all tests or quizzes.

5- Do various homework every week

6- Period exams.

13. Forms of teaching

Teaching by presentation and class discussion

- by write most information and exercises to clarify it using white board.

- gave the students subject papers

- The practical section includes examples of agricultural statistics

    - English is the main language for teaching in addition to Kurdish and Arabic.

14. Assessment scheme

Two tests during the semester:

- First midterm test (Covers topics of Week 1 to Week 4)
- Second midterm test (Covers topics of Week 4 to Week 8): 35 marks
- There will be weekly quizzes and conversation: 10 marks
- Final exam will be done together: 50 marks

15. Student learning outcome:

1- As first step student knew how they do simple research by collecting data and organized, then represent it and interpreted to get new information, also Students will be able to perform comparison between two samples and finally construct ANOVA table.

2- Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs.

16. Course Reading List and References:

-بۆتانی، دلشاد . (2015)..''ئامارزانی'' ، کۆلێژی بەرێوەبردن وئابوری - زانکۆی سەلاحەددین—هەولێر

-الراوي ، خاشع . (1982). '' المدخل الى االاحصاء''. جامعة الموصل .

-کرش ، عماد توما و اخرون، (2014). علم االحصاء. املعهد التقین بالموصل

-حجازی، سهیر فهمی و الدرینی، محمود، (2004). الاحصاء التطبیقي. کلیة التجارة —جامعة طنطا - مصر

-بوب دیفز، (2011). مقدمه فى الاحصاء الزراعى. مهدى بن معیفى السلطان (مرتجم) - جامعة الملك سعود

- Sheldon M. Ross, Introductory Statistics. University of Southern California. 3rd Ed. 2010, Elsevier Inc.
- Townend J., 2002. Practical statistics for environmental and biological scientists
- Lawal, B., 2014. Applied Statistical Methods in Agriculture, Health and Life Sciences. Springer International Publishing Switzerland.
- Pagano, M., and Gauvreau, K., 2018. Principles of Biostatistics. 2 nd edition. CRC Press.
    Also Search from web pages

17. The Topics:	Lecturer's name

1st week: Introduction and Terminologies
     - basic terms and symbols
2nd week: Data Presentation
      - Tabular Presentation
     - Graphical Presentation
3rd week: Statistical Measurements; solve examples about:
     - Measures of Central Tendency:
     - (Mean, median, mode, … etc.)
4th week: Measures of Dispersion and Variation; solve examples about:
     - (Rang, variance, SD, SE and CV%)
     - Testing the accuracy of data
5th week: Exam
6th week: Significance Test and Hypothesis Test:
Solve examples about: the three kind of t-test
7th week: Z-test.
8th week: Chi-square test.
9th week: prepare ANOVA table and compute F-test.
10th week: Simple Correlation
11th week: Simple Regression.
 	
Practically computer training in the lab using available applications such as MS-Excel program and solving problems (examples) manually for topics that we mentioned before.
	Shiraz Abdulkhaliq
	Practical: 3 hrs weekly

19. Examinations:

Q1/ (a) If the CaCO3% of (8) samples of soils were (25, 24, 25, 22, 25, 20, 22 and 21) calculate:

1- **Median**

   20, 21, 22, <mark>22</mark>, <mark>24</mark>, 25, 25, 25 ➔ even no. and n=8

   n/2 and (n/2)+1 ➔ 4th and 5th no.

   median = (22+24)/2=23

2- Mode? Mode is 25

3- Test the accuracy of data.

$$S^2 = \frac{\sum x_i^2 - \frac{\left(\sum x_i\right)^2}{n}}{n-1} = \frac{4260 - \frac{(184)^2}{8}}{7} = 4$$

$$S = 2$$

$$S_{\bar{x}} = \frac{S}{\sqrt{n}} = 2/\sqrt{8} = 0.7071$$

$$\bar{x} = \frac{184}{8} = 2 \quad ➔ \quad 2 * 0.05 = 0.1$$

0.7071 > 0.1 ➔ data not accurate

(b) Find the tab. value from the special (student's t) tables, when:

1- $\propto$ =0.01 and df =15 ➔ tab. value=2.60248

2- $\propto$ = 0.05 and n =24 ➔ tab. value=1.710882

Q2/ To evaluate the effect of (4) types of hormones on egg production of 16 homogeneous chickens during 15 days, the following results were obtained:
Now Construct ANOVA table.

Hormones	y_{ij}				sum
A	10	9	12	11	42
B	9	8	7	9	33
C	11	12	13	11	47
D	15	14	13	14	56
					G=178

CF= G2/tr =(178)2/4*4 =1980.25

$$SST = \sum y_{ij}^2 - CF = 10^2 + 9^2 + 12^2 + \ldots + 13^2 + 14^2 - 1980.25$$

SST= 2062 – 1980.25=81.75

$$SSt = \frac{42^2 + 33^2 + 47^2 + 56^2}{4} - 1980.25$$

SSt=69.25
SSe=SST-SSt= 81.75-69.25=12.5

ANOVA Table

S.O.V	Df	SS	MS	Cal.F
Treatment	3	69.25	23.08	22.192 *
Error	12	12.5	1.04	
Total	15	81.75		

Q3/ To evaluate the daily productivity of milk of two fields. (64) Cows were taken from each Field. The average daily production of the first field was (100) liters with the standard Deviation of (9) liters, while the average daily production of the second field was (110) liters with the standard deviation of (15) liters. Did the daily milk production in both fields are differ under the significant levels (0.05)?