Inspiring Innovation and Leadership

KARATINA UNIVERSITY
SCHOOL OF PURE AND APPLIED SCIENCES
DEPARTMENT OF MATHEMATICS, STATISTICS & ACTUARIAL SCIENCE
COURSE OUTLINE

Course Code:	**BBM 350**
Course Title:	Managerial Statistics
Program(s):	Bachelor of Business Management (B100) Bachelor of Education Arts (E100) Bachelor of Arts with Education (E111)
Year and semester	Y3S1
Lecturer Name:	Ms. Beryl Ang'iro
Lecturer Contacts:	Email: bangiro@karu.ac.ke

Expected Learning Outcomes:

By the end of the course, the learner should be able to:

i) apply the method of moments and maximum likelihood in estimation.

ii) determine the properties of estimators.

iii) apply different methods of interval estimation of a single parameter.

iv) Explain the concepts of a statistical test.

v) Derive various parametric statistical tests for testing simple and composite hypotheses.

vi) Derive various tests for correlation and regression.

Course Content

Methods of estimation; Maximum Likelihood Method (MLE), method of moments. Interval estimation. Confident interval for the mean and the variance of a normal distribution; Application to real data.

Hypothesis Testing: Concepts of a statistical test., simple and composite hypotheses. Two types of error. Power of a test. Two-sample and paired sample tests. Small and large sample tests. Tests for correlation and regression coefficients; Exact sampling distribution – Chi- Square, t, F, Z – distributions. Analysis of Variance: one – way and two-way analysis of variance
Non-Parametric Statistics, Statistical applications in Quality Control.

Lecture Schedule

Week	Topic	Sub – Topic	Remarks
1 -2	**METHODS OF ESTIMATION**	• Method of moments. • Maximum likelihood method.	
3	**INTERVAL ESTIMATION**	• Interval estimation for single parameters • Confidence interval for the mean of a normal distribution	
4		• Confidence interval for variance of a normal distribution	
5	**CONCEPTS OF A STATISTICAL TEST**	• Introduction • Simple and Composite Hypotheses • Decision Rule • A Test • Critical Region	
6		**CAT ONE**	
7		• Power Function • Type I Error • Type II Error	
8	**TESTING A SIMPLE NULL HPOTHESIS VERSUS A TWO-SIDED ALTERNATIVE HYPOTHESIS**	• Testing a Simple Null Hypothesis Versus a Two-Sided Alternative Hypothesis	‘’
9		**CAT TWO**	
10	**SAMPLING FROM TWO INDEPENDENT NORMAL DISTRIBUTION**	• Equality of Means • Small and Large Sample Tests	‘’
11	**TESTS FOR CORRELATION AND REGRESSION COEFFICIENTS**	• Tests for Correlation and Regression Coefficients • Confidence Bounds.	‘’
12	**SAMPLING DISTRIBUTIONS**	• The Normal Distribution:- the Z-test for matched and unmatched samples. • The Student’s t- distribution:- the t test for matched and unmatched samples. • Chi-Square Distribution • F-distribution.	

		• Standardized variables and use of tables.	
13	**ANALYSIS OF VARIANCE**	• One- way ANOVA • Two-way ANOVA	
14	**NON-PARAMETRIC TESTS**	• Sign test; • Wilcoxons Rank test, • Kruskal-Wallis test.	

References

i) Miller, I. & Miller, M. (2004). *Mathematical statistics*. New Delhi Dorling Kindersley Pvt ltd. Available at http://opac.karu.ac.ke

ii) RV Hogg, JW McKean & AT Craig (2003). *Introduction to Mathematical Statistics,* 6th ed., Prentice Hall.

iii) HJ Larson. *Introduction to Probability Theory and Statistical Inference.* 3rd ed., Wiley.

iv) Matthew J., Ph.D. Hassett and Donald Stewart (2006). *Probability for Risk Management*. ACTEX Publications.

v) Robert V Hogg and Elliot A. Tanis (2005). *Probability and Statistical Inference,* 7th ed. Prentice Hall College Div.

4.0 COURSE TEXTBOOKS:

i) RV Hogg, JW McKean and AT Craig, (2004), Introduction to Mathematical Statistics, 6th edition, Prentice Hall, ISBN: 978-0130085078

ii) HJ Larson, (1974) Introduction to Probability Theory and Statistical Inference (Wiley Series in Probability and Mathematical Statistics). 2nd edition, Wiley, ISBN: 978-0471517818

iii) I Miller and M Miller, (2012), John E Freund's, Mathematical Statistics with Applications, 8th edition, Pearsons Education, New Jersey, ISBN: 9780321807090

5.0 REFERENCE TEXTBOOKS

i) Dennis Wackerly, William Mendenhall, and Richard L. Scheaffer, (2001), Mathematical Statistics with Applications. Duxbury Publishers, ISBN: 9780534377410

ii) Anderson, T. (2003), An Introduction to Multivariate Statistical Analysis. Wiley, ISBN: 9780471360919

iii) Robert V Hogg and Elliot A. Tanis, (2009), Probability and Statistical Inference, 8th edition Pearson, ISBN: 9780321584755

6.0 COURSE JOURNAL

i) Lifetime data Analysis (Statistical Methods), Springer US, ISSN: 13807870

ii) Journal of Global optimization, Springer US, ISSN: 0925-5001

iii) International Journal of Stochastic Analysis, Hindawi Publishing-New York, ISSN: 1687-2177

7.0 REFERENCE JOURNALS

i) Theory and Decision, Springer, ISSN: 00405833

ii) Mathematica Panonica, The Editorial Board of Mathematica Pannonica, ISSN: 08652090

iii) Journal of Applied Mathematics and Mechanics, John Wiley and Sons Inc, ISSN 0044-2267

Lecturer Ms. Beryl Ang'iro **Sign:**  **Date: 27/08/2024**

Was the course outline issued on the first lecture? | Yes | | No |

Class Rep _____ **Sign:** _____ **Date:** _____

Approved for circulation by:

HOD Dr. Daniel Achola **Sign:** _____ **Date:** _____