MOI UNIVERSITY

DEPARTMENT: MATHEMATICS, PHYSICS AND COMPUTING
COURSE CODE/TITLE: STA 205: STATISTICS & PROBABILITY
YEAR OF STUDY: SECOND **SEMESTER:** SECOND
COURSE LECTURER: DR. SILVER J. KENY-RAMBAEI
CELL NO.: 0723/0735 900 006 **EMAIL:** keny.silver.jeptoo@gmail.com
EXAMINATION FOR: BSc. IN COMPUTER SCIENCE
TOTAL NO. OF LECTURE HOURS: FOURTY TWO HOURS

Course goals:
Introduce basic concepts of probability and statistical inference with discussion of applications to computer science.

Course Objectives/ Expected Learning Outcomes

At the end of the course, the students should be able to:

- Explain and perform arithmetic operations on probability.
- Equip the learners with knowledge of probability distributions and their use in solving statistical problems
- Enable the learner to use statistical techniques in Quality Control processes
- Describe and apply more advanced statistical concepts to real life situation.

Course Content

- Basic Probability: Definition and interpretation of probability; axioms of probability; basic properties of probabilities.
- Working with Probabilities: Counting / permutations and combinations; conditional probability; independence of events; Bayes' Theorem;
- From Probability to Statistics: Role of simulation in studying probability distributions; role of sampling in studying populations (transition to statistics)
- Random Variables: Discrete case: Introduction to random variables emphasizing the discrete case; expectation, mean, variance.
- Discrete examples: Examples of discrete distributions (binomial, Poisson);
- Random Variables: Continuous case: Examples of continuous distributions (exponential normal distribution;
- Elementary treatment for large and small samples; Statistical Tests and Decisions (Testing hypotheses about parameters and making decisions: Z, t, F and Chi-square);
- Method of least squares and curve fitting;
- Correlation and Regression analysis: Use linear regression as example of how probability models are used in practice;
- Estimation of Parameters: Point and interval estimation of parameters of probability distributions;
- Application of statistics in quality control

WEEK	CONTENT TO BE COVERED
1	Introduction: Basic Probability, definition and interpretation of probability, important terminologies used in probability, operation of set and algebra of sets and relationship between statistics and probability
2	Conditional probability; independence of events; Bayes' Theorem; Sampling
3	Random Variables: Discrete case: Introduction to random variables emphasizing the discrete case; expectation, mean, variance. Discrete examples: Examples of discrete distributions (binomial, Poisson)
4	Continuous: normal distribution; Elementary treatment for large and small samples; Testing hypotheses about parameters and making decisions: Z, t
5	Testing hypotheses about parameters and making decisions: F and Chi-square
6	**CAT 1**
7	Method of least squares and curve fitting
8	Correlation and Regression analysis: Use linear regression as example of how probability models are used in practice;
9	Estimation of Parameters: Point and interval estimation of parameters of probability distributions;
10	Application of statistics in quality control
11-13	**END OF SEMESTER EXAMINATIONS**

Instructional material / equipment
Textbooks, whiteboard, chalkboard, hand outs

Course Assessment:

Continuous assessment Tests	30%
End of semester examination	70%
Total	**100%**

References

Jay L. Devore, Probability and Statistics for Engineering and the Sciences, (2004), Brooks/Cole Publishing, Belmont, USA.
Mario F. Triola (2001), Elementary Statistics, Addison- Wesley Publishing Company.
Morris H. DeGroot(1989), Probability and Statistics, Addison- Wesley Publishing Company, Reading, USA.

Textbook: *A First Course in Probability* by Sheldon Ross (Prentice Hall, 7th edition, 2005).

Lecturer's Sign: _____ **Head of Department's Sign: _____**

Date: _____ **Date: _____**