

STA 3309 STATISTICS COURSE OUTLINE, FALL SEMESTER

COURSE	: STA 3309 Statistics
MIDTERM	: Announced in class
GRADING	: 30% Midterm and 80% Final
ATTENDANCE	: 60% Attendance is required to qualify for the final
INSTRUCTURE	: Assoc. Prof. Dr. Rukiye DAĞALP
OFFICE	: Ankara University, Faculty of Sciences Department of Statistics, Tandoğan – Ankara e-mail: rdagalp@ankara.edu.tr or rdagalp@gmail.com

REFERANCE BOOKS :

1. Probability and Statistics for Engineers and Scientists, Walpole, Myers, Myers and Ye (2012), 9th Pearson Education (Textbook)
2. Mathematical Statistics with Applications, Wackerly, Mendenhall and Scheaffer (2008), 7th Ed. Duxbury
3. Mathematical Statistics, Miller and Miller (1999), Prentice-Hall Inc.
4. Statistical Inference, Casella and Berger (2002), Duxbury, Introduction to Mathematical Statistics: Hogg and Craig (1995)

TENTATIVE COURSE PLAN:

1. **Introduction:** Basic concepts, probability, random variables, discrete and continuous random variables, functions of random variables, distribution functions and its properties, probability mass functions and probability density function
2. **Moments of random variables:** Expectation, variance, skewness, kurtosis, generating functions (moment generating function, probability generating functions etc.) and their properties
3. **Multivariate distributions:** Multivariate distributions, marginal and conditional distributions, conditional expectation, covariance and correlation
4. **Transformations:** Distribution functions of random variables, transformations for discrete and continuous random variables, distribution functions techniques, moment generating functions techniques, moments and generating functions of functions of random variables
5. **Some special distributions:** Discrete distributions: Uniform, Bernoulli, Binomial, Geometric, Negative Binomial, Poisson, Hypergeometric, etc. and continuous distributions: Uniform, Gamma, Exponential, Chi-Squares, Beta, Normal, Bivariate Normal
6. **Sampling Distributions:** Sample and sampling, distribution of sample mean and sample variance, sampling distributions related to Normal distribution, t and F distributions, Central limit theorem, Normal approximation to the Binomial distribution
7. **Estimation:** Basic concepts, the bias and mean squared error of point estimators, confidence intervals of point estimators, selecting sample size, properties of point estimators (sample statistics) (unbiasedness, consistency, sufficiency, efficiency, etc), methods for finding estimators (MM, MLE, OLS, Bayesian) and their properties
8. **Hypothesis Testing:** Basic concepts, test statistics, error probabilities, power of a test, inference about population mean and variance, confidence intervals, testing hypothesis concerning variances, likelihood ratio tests
9. **Regression:** Simple linear regression and its basic assumptions, parameter estimation, properties of OLS estimators of the parameters, Analysis of Variance Table, tests for parameters, confidence intervals, weighted least squares, prediction, model without intercept.