Introduction to statistics and probability using Python (3 credits) Prof. Yosef Ashkenazy
Pre requisite: None
1-2-4029

- The course requirements include the submission of homework assignments.
- The grade is determined by a final exam.

The Course includes:
1. Introduction: What is statistics? the uses of statistics, frequency distributions,
   cumulative frequency distributions, graphic presentation.
   Python getting started: installing python, Anaconda, Jupyter Notebook, basic
   examples.
2. Descriptive measures: Symbols and summation notation, measures of location, mean,
   weighted mean, median, mode, selecting a measure of location, measures of
   variations, range, variance and standard deviation, changes of scale, coefficient of
   variation
   Python: basic libraries, variables, random numbers, statistical measures.
3. Elementary probability: the meaning of probability, factorial notation, permutations
   and combinations, combined events, repeated independent trials.
   Python: conditional statements and loops ("if", "for" and "while" statements).
4. Population, samples and theoretical distributions: random variables, theoretical
   distributions of random variables, parameters and statistics, normal distribution,
   binomial distribution, normal approximation to the binomial.
   Python: distribution using python, plotting. Demonstration of the central limit
   theorem.
5. Estimation: estimating parameters of normal and binomial distributions, interval
   estimates, confidence interval for the mean of a normal distribution (with known and
   unknown variance), t-distribution, sample size, confidence interval for p.
   Python: shuffling tests and confidence interval.
6. Regression and correlation: linear regression, partitioning the sum of squares, variance
   estimates, inference about A and B, coefficient of determination, uses of regression,
   correlation.

Recommended Reading:
- Huntsberger, D.V. (1967). _Elements of Statistical inference_, Allyn and Bacon
- Williams, B. (1993). _Biostatistics_, Chapman & Hall
- Hoel, Port & Stone, (1971). _Introduction to Probability theory_, Houghton Mifflin Co.
- McKinney, W. (2013). _Python for Data Analysis_, O'Reilly Media
- Matthes E. (2016). _Python Crash Course_, No Starch Press,