1. Course number and name: BMED 2400 Introduction to Bioengineering Statistics
2. Credits and contact hours: (3-0-0-3)
3. Prepared by: Essy Behravesh
4. Textbook: Statistics for Engineering Sciences, B. Vidakovic, Springer-Verlag IBSN 978-1-4614-0393-7 pp 753 (2011)
5. Specific course information:
   a. Catalog description: Introduction to statistical modeling and data analysis in bioscientific and bioengineering applications. Topics include estimation, testing, regression, and experimental design
   b. Prerequisites or co-requisites: CS 1371 and MATH 1552
   c. Required
6. Specific goals for the course
   a. Understand basic statistical methods and models (Student Outcome 3)
      i. Identify various population distributions
      ii. Summarize and describe data, identify parameters, and calculate their point and interval estimates
      iii. Test for independence of factors and for agreement between theoretical and empirical distributions
   b. Formulate and test statistical hypotheses towards the solutions of biomedical engineering problems (Student Outcomes 1 and 6)
      i. Formulate and test statistical hypotheses involving locations, variances, and proportions in one, two, and more than two populations
      ii. Analyzing correlations and apply linear regression methodology
      iii. Apply logistic and Poisson regression analyses
7. Brief list of topics to be covered:
   a. Data and data summaries; Overview of descriptive statistics; Probability;
   b. Sensitivity/specificity calculations
   c. Probability distributions as models for experimental observations
   d. Basic discrete and continuous distributions; Example of biomedical problems in which such distributions are appropriate models
   e. Estimation, Testing hypotheses
   f. Two sample problems; Elements of statistical experimental design
   g. Correlation; Linear simple and multiple regressions, logistic and Poisson regressions
   h. Chi-square theory: Tables and goodness-of-fit tests
   i. Basic nonparametric procedures