Statistics

STAT 1342 (MATH 1342) Statistical Decision Making (3 semester hours) Principles of quantitative decision making: summarizing data, modeling uncertainty, loss functions, probability, conditional probability, random variables. Introduction to statistics: estimation, confidence intervals, hypothesis testing, regression. Introduction to statistical packages. Cannot be used to satisfy degree requirements for majors in the School of Engineering and Computer Science, or major requirements in the Schools of Management or Natural Sciences and Mathematics. Prerequisite: MATH 1306 or MATH 1314 or equivalent. (3-0) S

STAT 3103 Statistical Computer Packages (1 semester hour) An introduction to the use of statistics packages, such as SAS, BMD, SPSS, Minitab, and S, for the analysis of data. Based primarily on self-study materials. Cannot be used to satisfy degree requirements for mathematics majors. Prerequisite: one semester of statistics. (1-0) S

STAT 3332 Statistics for Life Sciences (3 semester hours) Graphs, histograms, mean, median, standard deviation, Chebyshev's inequality, standardized scores, simple linear regression and correlation; basic rules of probability, Bayes theorem; Normal t, chi squared, F, binomial and Poisson distributions; point estimation; hypothesis tests and confidence intervals for means, proportions regression coefficients, and correlation; one way ANOVA; contingency tables. Applications in life sciences will be emphasized throughout the course. Cannot be used by mathematics, engineering, or computer science majors to satisfy degree requirements. Prerequisite: MATH 2312 or MATH 1325 or equivalent. (3-0) S

STAT 3341 Probability and Statistics in Computer Science and Software Engineering (3 semester hours) Axiomatic probability theory, independence, conditional probability. Discrete and continuous random variables, special distributions of importance to CS/SE, and expectation. Simulation of random variables and Monte Carlo methods. Central limit theorem. Basic statistical inference, parameter estimation, hypothesis testing, and linear regression. Introduction to stochastic processes. Illustrative examples and simulation exercises from queuing, reliability, and other CS/SE applications. Students cannot get credit for both (CS 3341 or SE 3341 or STAT 3341) and ENGR 3341. Prerequisites: (MATH 1326 or MATH 2414 or MATH 2419), and (CE 2305 or CS 2305 or TE 2305). (Same as CS 3341 and SE 3341) (3-0) S

STAT 3355 Data Analysis for Statisticians and Actuaries (3 semester hours) Methods of data analysis used in different areas of Statistics and Actuarial Science. Sampling, fitting and testing models, regression, and comparison of populations. A statistical computer package will be used. Prerequisite: MATH 2415 or MATH 2419. (3-0) Y

STAT 3360 Probability and Statistics for Management and Economics (3 semester hours) Probability theory including independence, conditioning, density functions, frequently used families of distributions, random variables, expectation, moments, and the central limit theorem; statistical inference including sampling, estimation, hypothesis testing, and regression. Cannot be

used by mathematics, engineering, or computer science majors to satisfy degree requirements. Prerequisite: MATH 1326. (3-0) S

STAT 4351 Probability (3 semester hours) Sample spaces, probability of events, Kolmogorov's axioms, independence and dependence, Bayesian methodology. Discrete and continuous random variables. Probability distributions, mass functions and densities of univariate and multivariate random variables. Expected values, variances, moment generating functions, covariances and related issues. Probability inequalities. Special probability distributions and special probability densities. Functions of random variables, distribution function techniques, transformation techniques for one and several variables, moment-generating techniques. The law of large numbers, the central limit theorem and classical sampling distributions. Proofs of all main results. Practical examples illustrating the theory. The course can be used as a preparation for the first (Probability) actuarial exam. Prerequisite: MATH 2451. (3-0) Y

STAT 4352 Mathematical Statistics (3 semester hours) Sampling distributions. Order statistics. Decision theory including minimax and Bayes criterion. Point estimation including unbiased estimators, efficiency, consistency, sufficiency, robustness, the method of moments, the method of maximum likelihood, Bayesian estimation. Interval estimation including the estimation of means, differences of means, proportions, differences between proportions, variances and ratios of variances. Hypothesis testing including Neyman-Pearson lemma, power function and likelihood ratio test. Special tests involving means, variances and proportions. Nonparametric tests. Foundations of regression, correlation, design and analysis of experiments. Proofs of all main results. Practical examples illustrating the theory. The course can be used as a preparation for the statistical part of the fourth actuarial exam. Prerequisite: STAT 4351 or equivalent. (3-0) Y

STAT 4382 Stochastic Processes (3 semester hours) Stochastic models including Markov chains, random walks, Poisson processes, renewal processes, and an introduction to time series and forecasting. Prerequisite: STAT 4351 or equivalent. (3-0) Y

STAT 4v02 Independent Study in Statistics (1-6 semester hours) Independent study under a faculty member's direction. May be repeated for credit as topics vary (9 hours maximum). Prerequisite: Student must obtain approval from participating mathematics faculty member and the undergraduate advisor. Can satisfy Communication elective (3 hours) if it has a major writing/ report component. ([1-6]-0) S

STAT 4v97 Undergraduate Topics in Statistics (1-9 semester hours) Subject matter will vary from semester to semester. May be repeated for credit as topics vary (9 hours maximum). ([1-9]-0) S