

PROBABILITY and STATISTICS I & II

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Course Description Summary: Probability and Statistics I covers descriptive statistics, elementary probability, probability distributions, estimation, and hypothesis testing. Probability and Statistics II continues the study of estimation and hypothesis testing with emphasis on curvilinear and nonlinear regression, analysis of variance, chi-square tests, and non-parametric methods. Additional material may be added at the discretion of the instructor.

Dual Enrollment Credit: Statistics I: 3 hrs (MTH 241); Statistics II: 3 hrs (MTH 242)

Prerequisites: Algebra II

Required Text and Materials: *Introduction to the Practice of Statistics* (fifth edition)
by David S. Moore and George P. McCabe
with study guide and *EStat* Pack cd-roms;
Graphing Calculator;
Wacom Intuos 3 Pen Tablet
Minitab Release 14 Student Edition software;
ActivStats for Minitab software;
Chance Lectures cd-rom.

Course Objectives: This course is designed to introduce students to fundamental techniques of probability calculation and statistical analysis. Students will learn basic mathematical tools for effective experiment design, experimental results analysis, inference from sampling data, and probability determination. Class discussion will emphasize how statistics and probability relates to contemporary topics of interest.

Instructional Methods: This course is taught in a lecture format via the Internet using interactive audio and limited streaming video. Additional methods may include student research projects, research papers, and analysis using computer software and/or software development. Homework assignments and tests are distributed and collected via E-mail, FAX, and/or USPS.

Evaluation Methods: Grades will be based upon class participation, homework and other out-of-class assignments, pop quizzes, tests over both material from the text and material presented in class, other supplementary assignments, and a comprehensive semester final exam. A grade assignment scale in accordance with the Governor's School Student Handbook (i.e., 90-100: A, etc.), both numerical and letter, is used.

Homework assignment grades, test scores, and averaged grades may be scaled upward at the discretion of the instructor. There is no “extra credit.”

Attendance: Students are expected to attend all classes. While in class, students are expected to be attentive and prepared to talk if called upon. Therefore, students observed conducting any activity not in keeping with the current class discussion (e.g., surfing the internet, viewing party pictures, checking e-mail, having an instant message program running) will be removed from class for the day and receive a grade of zero for the day. [This grade of zero will be averaged with the student’s quizzes as if an additional 60 point quiz was given and the student in violation received a grade of zero for the quiz.]

It is the responsibility of students with scheduled absences to notify the instructor in advance. It is not the responsibility of the instructor to remember any student’s schedule. Students must contact the instructor well in advance of any test date which may be missed due to an excused scheduled absence. Upon contact, an alternate test date, which must be before the announced date, may be scheduled at the discretion of the instructor. No “make-up” exam after a scheduled exam date will be given. Students failing to obtain an alternate date will receive a grade of zero for the missed graded work. In exceptional cases at the discretion of the instructor, other exam grades may be averaged and the average grade calculated subsequently used to replace the missed exam.

A numerical grade of zero will be immediately assigned for any missed graded assessment. The grade will be replaced with the earned assessment grade upon successful fulfillment of the policy, as stated above, regarding missed assessments. Any and all averages calculated using the zero will also be recalculated and grade change requests issued where required.

Students can be excused from class and/or class obligations (test, etc.) only by the Governor’s School Probability and Statistics instructor.

Assignment Submission: All assignments must be submitted to the instructor no later than the announced and/or posted due date. No late submissions will be accepted. An excused absence does not relieve the student from their obligation to submit work by the announced due date. For example, if a scheduled absence will occur on an assignment due date, the assignment must then be submitted prior to the absence. (Exceptional cases will be considered provided the instructor is notified and consulted as soon as possible in advance of the due date.) Technical failures, e.g., “internet down”, do not provide justification to permit acceptance of late work. “Waiting to the last minute” to submit work is at the student’s own risk.

Mailed submissions must be postmarked no later than the due date. It is always the student’s responsibility to see that the assignment is mailed at a time and place to ensure that this requirement is met.

All hand written assignment work - homework, test, and/or quiz - must meet the guidelines listed in the *Assignment Submission Guide*.

Hand written graded work is returned to the student as a PDF file E-mail attachment.
The original paper work will not be returned.

Code of Conduct: ALL homework assignments, projects, test, research papers, computer projects, and in-class assignments are to be the work of the individual student. That is, plagiarism, cheating, and any other form of academic dishonesty are prohibited. Unless explicitly permitted on an individual assignment by the instructor, collaboration in any way on any assignment will be considered a violation of the Governor's School Code of Conduct. As such, the student will be assigned a grade of zero for any violation as a **minimum** disciplinary action. For any one violation, a student may also receive a failing grade for the class and/or be dismissed from the Governor's School.

Policy Applicability: The policy stated in this syllabus as to test dates, homework submission requirements, etc. supersedes any student's home school policy.

Course Content:

- Data Distributions
 - Graphical Methods
 - Mean, Median, Mode, Variance, and Standard Deviation
 - Normal Distributions
- Data Relationships
 - Scatterplots
 - Correlation
 - Least-Squares regression
- Experiment Design
- Probability
 - Probability Models
 - Random Variables
 - Means and Variances of Random Variables
 - General Probability Rules
- Probability and Inference
 - Sampling Distributions for Sample Means and Proportions
 - Manufacturing Control Charts
 - Confidence Intervals
 - Test of Significance: z test, t test, etc.
- Inference for Distributions and Proportions
 - Inference for a Single Proportion and the Mean of a Population
 - Comparing two proportions and comparing two means
- Inference for Two-Way Tables
 - Chi-Square Test and z test
- Inference for Regression: Simple Linear Regression
- Multiple Regression and Non-Linear Regression by the Method of Least Squares
- One-Way Analysis of Variance
 - The ANOVA hypotheses and model
 - The F test

- Two-Way Analysis of Variance
 - The two-way ANOVA model
- Nonparametric Tests
- Logistic Regression

Material may be added and/or deleted.