



HOUSTON COMMUNITY
COLLEGE SYSTEM

NORTHEAST COLLEGE

Department of Mathematics
Course Syllabus

MATH 1342: Statistics **Spring 2011 Mini-Session**

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Conference Hours: M, Tu, W, Th, F 12:00- 12:30pm, By Appointment

Catalog Description: MATH 1342 Statistics. Topics include histograms, measures of central tendency and variation, probability, binomial and normal distributions, and their applications, confidence intervals, and tests of statistical hypotheses. 3 credit (3 lecture).

Credit: 3 credit (3 lecture).

Prerequisites: MATH 1314 or its equivalent or an acceptable placement test score.

Course Intent: This course is intended for students primarily in health sciences and business rather than math or science majors. It consists of concepts, ideas, and applications of statistics rather than a theory course.

Audience: This course is for students who require a statistics course as a prerequisite for further study.

MATH 1342: Statistics

Student Learning Outcomes	Course Objectives
1. Understand basic concepts and vocabulary for probability and statistics.	1.1 Demonstrate knowledge of statistical terms. 1.2 Understand the difference between descriptive and inferential statistics. 1.3 Identify types of data, measurement level of variables, and four basic sampling techniques.
2. Organize, analyze, and utilize appropriate methods to draw conclusions based on sample data by using tables, graphs, measures of central tendency, and measures of dispersion.	2.1 Construct the relative frequency table from a given set of ungroup data. 2.2 Know and use the different graphs: histogram, frequency polygon, Ogives, Pareto, and pie to present data. 2.3 Compute the mean, median, mode, midrange, range, variance, and standard deviation. 2.4 Identify the various measures of position such as percentiles, deciles, and quartiles. 2.5 Find the total number of outcomes in a sequence of events using tree diagram and multiplication rule.

Student Learning Outcomes	Course Objectives
<p>3. Collect univariate and bivariate data, interpret and communicate the results using statistical analyses such as confidence intervals, hypothesis tests, and regression analysis.</p>	<p>3.1 Understand the use of permutation and combination rules. 3.2 Determine sample spaces and find the probability of an event using classical probability.</p> <p>3.3 Find the probability of compound events using addition and/or multiplication rules. 3.4 Find the conditional probability of an event 3.5 Construct a probability distribution for a random variable 3.6 Find the mean, variance, and expected value for a probability distribution function. 3.7 Find the mean, variance, and standard deviation for binomial distribution. 3.8 Identify the properties of the normal distribution. 3.9 Find a confidence interval for the mean when s is known or $n > 30$. 3.10 Determine the minimum sample size for finding a confidence interval for the mean. 3.11 Find a confidence interval for the mean when s is unknown and $n < 30$. 3.12 Find a confidence interval for proportion. 3.13 Determine the minimum sample size for finding a confidence interval for a proportion. 3.14 Find a confidence interval of variance and standard deviation.</p>
<p>4. Calculate probabilities for binomial and normal probability distributions and find specific values for binomial and normal probabilities</p>	<p>4.1 Find the exact probability for X successes in n trial of a binomial experiment. 4.2 Find the area under the normal curve, given various z values. 4.3 Find probabilities for a normally distributed variable by transforming it into a standard normal variable. 4.4 Find specific data values for given percentages using the standard normal distribution. 4.5 Apply the central limit theorem to solve problems involving sample means. 4.6 Use the normal approximation to compute probabilities for a binomial variable.</p>

Student Learning Outcomes	Course Objectives
<p>1. Successfully perform testing of hypotheses using Standard Normal values and t-distribution values.</p>	<p>5.1 Understand the definitions used in hypothesis testing. 5.2 State null hypothesis and alternative hypothesis. 5.3 Understand the terms: type I error and type II error, test criteria, level of significance, test statistic. 5.4 Find the critical values for the z-test, t-test, and c-test. 5.5 Test hypothesis for means (large and small sample), proportions, variance, and standard deviation. 5.6 Draw scatter plot for a set of ordered pairs. 5.7 Compute the correlation coefficient and the coefficient of determination. 5.8 Compute the equation of the regression line by using the least square method. 5.9 Test a distribution for goodness of fit using chi-square. 5.10 Test independence and homogeneity using chi-square. 5.11 Use the one-way ANOVA technique to determine if there is a significant difference among three or more means. 5.12 Determine the difference in means using the Scheffe' or Tukey test if the null hypothesis is rejected in the ANOVA.</p>

Textbook: Bluman, Allan G., *Elementary Statistics A Step by Step Approach*, McGraw Hill, Seventh Edition, 2007. ISBN: 978-0-07-3251639

Course Outline :

APPROXIMATE TIME	TEXT REFERENCE
<p>Unit I - The Nature of Probability and Statistics (3 hours)</p> <p>This unit begins an introduction to statistics. Included are sections discussing descriptive and inferential statistics, variables and types of data, data collection and sampling techniques, and uses and misuses of statistics. The chapter concludes with a technology discussion.</p>	<p><i>Sections: 1.1-1.8</i></p>
<p>Unit 2 - Frequency Distributions and Graphs (3 hours)</p> <p>This unit begins with an introduction to organizing and presenting data. The major topics of this unit are construction of a frequency distribution table from an ungroup data and presented data by using: histograms, frequency polygons, ogives, bar graphs, Pareto charts, pie graphs, and time series graphs.</p>	<p><i>Sections: 2.1-2.5</i></p>
<p>Unit 3 - Data Description (4:30 hours)</p> <p>This unit covers measures of central tendency, measures of dispersion, and position measures. Topics include mean, median, mode, distribution shapes, midrange, range, variance, standard deviation, coefficient of variation, Chebyshev's theorem, z-scores, percentiles, deciles, quartiles, and outliers.</p>	<p><i>Sections: 3.1-3.6</i></p>
<p>Unit 4 – Probability and Counting Techniques (4:30 hours)</p> <p>This unit begins with an introduction to probability as a chance concept. The basic concepts of probability are covered in the unit. These concepts include probability experiments, sample spaces, the addition and multiplication rules, and conditional probabilities. Counting rules including permutations and combinations are also covered.</p>	<p><i>Sections: 4.1-4.7</i></p>
<p>Unit 5 – Discrete Probability Distributions (4:30 hours)</p> <p>This unit gives an introduction to distribution theory and explains the concepts and applications of a probability distribution. Topics include: mean and variance of discrete random variable and the binomial distribution.</p>	<p><i>Sections: 5.1-5.4.</i></p>
<p>Unit 6 - The Normal Distribution (4:30 hours)</p> <p>This unit begins with properties of a normal distribution. Topics include the standard normal distribution, application of the normal distribution, the central limit theorem, and normal approximation to the binomial distribution.</p>	<p><i>Sections: 6.1-6.7</i></p>

Unit 7 - Confidence Intervals and Sample Size*Sections: 7.1-7.6*

(6 hours)

This unit is an introduction to inferential statistics as related to estimation. Topics include confidence intervals for the mean (σ known and $n \geq 30$) and sample size, confidence intervals for the mean (σ unknown and $n < 30$), confidence intervals and sample size for proportions, and confidence intervals for variances and standard deviation.

Unit 8 - Hypothesis Testing*Sections: 8.1-8.5, 8.6-8.7 (Optional)*

(9 hours)

This unit begins with an introduction to the concepts involved in statistical hypothesis testing. Topics include steps in hypothesis testing of: the z-test for a mean and proportion, and the t-test for a mean using the traditional and p-value methods. A Chi-squared test for variance or standard deviation is optional.

Unit 9 - Correlation and Regression*Sections: 10.1-10.4*

This unit begins with an introduction to variable relatedness. Topics include scatter plots, correlation, and regression.

Unit 10 - Chi-Square*Sections: 11.1-11.3.*

This unit begins with an introduction to statistical tests for variance and good of fit. Topics include the chi-square distribution in test for goodness of fit and test for independence.

Unit 11 - The F Test and Analysis of Variance*Sections: 12.1-12.3. (Optional)*

This unit begins with an introduction to the F distribution, multiple comparison procedures and the analysis of variance. Topics include one-way analysis of variance, the Scheffe' test, and Tukey test.

Course policies and regulations

1. **Make-up exams** will not be given for any reason. The final exam score replaces one *missed* test score or your lowest test grade.
2. **Attendance**: You are expected to attend all classes. Do not schedule appointments when you are supposed to be in class. You are responsible for materials covered during your absence. Any student missing **over 12.5%** of the class time (**6 hours**) may be dropped from the course. It is always your responsibility to officially withdraw from the class if you are failing or if you decide for some reason to stop attending class. This means you must complete the proper HCC procedure. Failure to do so *will* result in failing the class with a grade of **F**.
3. **Tardiness**: You are expected to come to class on time.
4. **Academic dishonesty** can result in dismissal from the entire Houston Community College System and will not be tolerated. Any student caught cheating on a test will be dropped from the course with a grade of **F**. Any talking, sharing of information in any

manner, referring to books or notes, or using a calculator during an examination without the discretion of the instructor will be considered cheating.

5. Conduct: Be respectful to others at all times.

6. Homework and Quizzes: will be assigned regularly and discussed in class. A Homework completion grade will be given for each complete section. Homework must be completed before the next class session to get a completion check. The student is responsible for completion and understanding, and should use class discussions and conference hours to obtain help when having difficulties with the material. Unannounced Quizzes will be given during the semester. No makeup quizzes will be given.

7. Calculators: Scientific calculators can be used in all exams including the final exam. Cell phones are not to be used in class or during examinations.

8. Final Examination The final examination is comprehensive. The final exam must be taken by all students.

9. Grading System

Your final grade for the course will be evaluated according to the following ratio:

- 1. **Three Examinations**20% each
- 2. **Quizzes**10%
- 3. **Comprehensive Final** examination 30%.

The Final Course Average = $0.20(E1 + E2 + E3) + 0.10(Quiz) + 0.30(Final)$

10. Classroom Materials: Students should not feel that classroom notes and homework may be ignored in favor of the review sheet (if any is given) for each examination.

11. Grading scale

The following scale will be used at the end of the semester to assign a course grade based on the overall course average calculated using the weights above.

- 90-100.....A
- 80-89.....B
- 70-79.....C
- 60-69.....D
- Below 60.....F

12. Instructional resources available to the student

The student shall use the following resources to facilitate learning:

1. Learning Resource Centers (**LRC**): The center is staffed with mathematics faculty and student assistants,

And offers tutorial help, videotapes and computer-assisted drills.

2. Student's Solution Manual (available from the Bookstore)


3. References on algebra and calculus are available in the Library.

13. Weather: Inclement weather conditions will be posted on the HCC website and on regular mass media covering the Houston area.

14. Final Note: The instructor reserves the right to change or alter this syllabus to meet the changing needs of this course.

Resource Materials: Any student enrolled in Math 1342 at HCCS has access to the Academic Support Center where they may get additional help in understanding the theory or in improving their skills. The Center is staffed with mathematics faculty and student assistants, and offers tutorial help, video tapes and computer-assisted drills. Also available is a student's Solutions manual which may be obtained from the bookstore.

NOTICE: Students who repeat a course three or more times may soon face significant tuition/fee increases at HCC and other Texas public colleges and universities. If you are considering course withdrawal because you are not earning passing grades, confer with your professor / counselor as early as possible about your study habits, homework, test-taking skills, attendance, course participation, and tutoring or other assistance that is available.

 **Americans with Disabilities Act (ADA):** Any student with a documented disability (e.g., physical, learning, psychiatric, vision, hearing, etc.) who needs to arrange reasonable accommodations must contact the Disability Services Office at the respective college at the beginning of each semester. Faculty is authorized to provide only the accommodations requested by the Disability Support Services Office.