

# Probability and Statistics

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This course is an introductory college level statistics course. Students will study the science of designing studies, gathering data, and then classifying, summarizing, interpreting, and presenting this data to explain and support the decisions that are reached. Optional USM credit requires registration and \$75 USM fee. 1 Credit (HHS) and 4 Credit Hours (USM)

## Graduation Standards

5: Interpret, infer and apply statistics and probability to analyze data and reach and justify conclusions.

Unit 1	Overview of Statistics
Summary	This unit introduces Statistics as the art and science of collecting, organizing, describing, analyzing and drawing conclusions from data. Basic vocabulary and the distinction between descriptive statistics and inferential statistics is introduced.
Performance Indicators Assessed in Unit	5A. Summarize, represent, and interpret data on a single count or measurement variable. (S.ID.A) 5D. Understand and evaluate random processes underlying statistical experiments. (S.IC.A) 5E. Make inferences and justify conclusions from sample surveys, experiments, and observational studies. (S.IC.B) 5I. Use probability to evaluate outcomes of decisions. (STEM)
Unit 2	Analyzing Data
Summary	In this unit we learn to explore raw data and summarize it to make it meaningful to the end user. We learn to describe location and relationships among data values and we learn to describe the data in terms of the entire group. Using linear regression to model data, we make predictions and judge the goodness of fit for the model. When data is not linear, we learn strategies to linearize it and we use tables to work with categorical data.
Performance Indicators Assessed in Unit	5A. Summarize, represent, and interpret data on a single count or measurement variable. (S.ID.A) 5B. Summarize, represent, and interpret data on two categorical and quantitative variables. (S.ID.B) 5C. Interpret linear models. (S.ID.C)
Unit 3	Producing Data
Summary	In this unit we learn to design sampling techniques to prevent bias and design experiments which will give reliable results which provides an important foundation for all work in statistics. Erroneous conclusions often result from weaknesses and misunderstandings in data collection techniques

Performance Indicators Assessed in Unit	5D. Understand and evaluate random processes underlying statistical experiments. (S. IC.A)
<b>Unit 4</b>	<b>Probability</b>
Summary	This unit will cover basic concepts of probability as well as take an in-depth look at specific probability distributions. First we build on vocabulary and provide practice with finding simple and compound probabilities. The use of simulation to replicate trials once a probability model is constructed is emphasized. Next, we focus on different known distributions (binomial, geometric), especially the normal distribution. Each distribution is used to compute the likelihood of events. The normal distribution is given more attention, as it is identified to be the most important distribution we will study. Lastly, sampling distributions are studied and we apply the Central Limit Theorem which ensures normality of repeated samples.
Performance Indicators Assessed in Unit	5A. Summarize, represent, and interpret data on a single count or measurement variable. (HSS.ID.A.1-4) 5D. Understand and evaluate random processes underlying statistical experiments. (S. IC.A) 5F. Understand independence and conditional probability and use them to interpret data. (S.CP.A) 5G. Use the rules of probability to compute probabilities of compound events in a uniform probability model. (S.CP.B.6-7) 5H. Calculate expected values and use them to solve problems. (STEM)
<b>Unit 5</b>	<b>Inference</b>
Summary	In this unit, students will learn procedures to help decide if sample results support a hypothesis about a parameter value or if the results show that the hypothesis should be rejected. Our examination of sampling concepts give us the ability to figure out what type of sample results should happen if the hypothesized population value is correct. Students are able to determine when a difference between an observed value and the hypothesized value is statistically significant. The unit concludes with learning to use Chi-square procedures for testing categorical variables.
Performance Indicators Assessed in Unit	5A. Understand and evaluate random processes underlying statistical experiments 5B. Make inferences and justify conclusions from sample surveys, experiments, and observational studies

### **Summative Assessments Retake**

- Students have the opportunity to retake summative assessments.
- The student must submit a retake form to the teacher within five (5) school days of the date that the summative assessment score is reported to the student.
- The highest score a student can receive on a retake or late assessment is a 75.
- The score achieved on a retake will replace the current score (even if the score is lower).
- If a student is making up a test from an absence, that assessment will be graded up to 100.

## Grading of Formative Assessments

- Formative assessments will count as 20% of the grade.
- Formative assessments may be scored on either a 0-100 scale or a 0-4 scale.
- The 0-4 scale will be represented in Power School as 4=100, 3=87, 2=77, and 1=67.
- The method of scoring of formative assessments will be determined by assignment.