

**J. Sargeant Reynolds Community College  
Course Content Summary**

**Course Prefix and Number:** BIO 147      **Credits:** 1

**Course Title:** Basic Laboratory Calculations for Biotechnology

**Course Description:**

Prepares students to work effectively in a scientific laboratory through instruction of the metric system, scientific notation, exponents, solution making, pH readings, and the creation of standard curves for data analysis. Focus will be on quantitative skills needed to perform most basic laboratory work. Skills will be practiced and reinforced through application-based problems and hands-on activities. Lecture 1 hour. Total 1 hour per week. 1 credit

**General Course Purpose:**

Because entry-level technicians need to have strong quantitative skills, this course is designed to be taken prior to or to accompany BIO 250 Research Method and Skills to allow adequate time for instruction in this area. Such skills include the use of units, calculations, measurements, and conversions.

**Course Prerequisites and Co-requisites:**

None

**Student Learning Outcomes:**

Upon completing the course, the student will be able to

- Use metric system appropriately while conducting experiments
- Demonstrate competency in using Excel to perform laboratory calculations and data analyses
- Convert numbers to scientific notation in lab calculations
- Perform calculations with exponents when making dilutions of samples
- Perform solution making calculations accurately and carry them out in the laboratory
- Describe the concept of pH and relate it to concentration and exponents
- Create and analyze a standard curve with lab samples
- Represent data graphically
- Perform basic statistical analyses on laboratory data
- Use and interpret data derived from spectrophotometry
- Calculate amounts of nucleic acids and proteins
- Describe and create flowcharts
- Describe the use of flowcharts in product production

**Major Topics to Be Included:**

- Metric system conversions
- Calculations with exponents and scientific notation
- Significant figures
- Ratios and proportions
- Concentration problems

- Solution chemistry including pH
- Dilution series and serial dilutions
- Standard curve (calculation of the concentration of an unknown sample)
- Graphical methods of describing data
- Descriptive statistics
- Calculations pertaining to nucleic acids, proteins, cells, and other biotechnology laboratory calculations
- Flowcharts

**Effective Date/Updated:** August 28, 2023