

**Department:** Science

**Course Name:** Research Methods

**Course Description:**

An inquiry-based science elective offering students the opportunity to research a topic of interest in science and technology. Students are encouraged to investigate real-world topics and design, plan and implement a scientific investigation to address a research question. The course explores a variety of topics such as research methodology, ethical research practices, research and data analysis tools while engaging in collaborative work with research institutions. Students work towards the completion of a research project culminating in a final research paper and oral defense presentation. Prerequisite: Biology, Co-requisite: Chemistry and approval by teacher. There is fee of approximately \$100 for this class.

**Content:**

Scientific Methods  
Literature Review and Search  
Types of Investigations  
Research Design  
Data Types and Data Collection Techniques  
Quantitative and Qualitative Methods and Data Analysis  
Statistical Methods  
Laboratory Techniques  
Ethical Issues  
APA Writing Style

**Skills:**

Understand different scientific research designs and methods  
Learn how to set up a research study  
Understand correct ways to refer to and cite from scientific literature  
Perform literature reviews  
Formulate a research plan  
Measurements  
Problem Solving  
Use of laboratory technology and tools- PCR, Spin-column and Chemical DNA extraction, Gel Electrophoresis, CRISPR, Cell Culture, PCR purification, Custom Primers, Bacteriophage Isolation, Electrophysiological recordings  
Utilizing the features of the Learning Management System

**Text and Materials**

Will be provided by the teacher

**Methods of Instructions**

Direct Instruction  
Inquiry-Based Learning  
Cooperative Learning  
Demonstrations

**Methods of Evaluation:**

Scientific Lab Journal

Team Collaboration

Literature Review

Research Project

Written Progress Reports

Scientific Paper

