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.

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, Bacterial Transformation, Protein purification, SDS-PAGE gels, and many others.
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