DEPARTMENT: SCIENCE

NAME OF COURSE: **Principles of Engineering (POE)**

GENERAL DESCRIPTION OF COURSE: POE is a survey course of the various types of engineering. Students will encounter major concepts that they will encounter in a postsecondary engineering course of study. Through problems that engage and challenge, students explore a broad range of engineering topics, including mechanisms, the strength of materials and structures, automation, and kinematics.

The course applies and concurrently develops secondary level knowledge and skills in mathematics, science, and technology. Students have the opportunity to develop skills and understanding of course concepts through activity-, project-, and problem-based (APB) learning. By solving rigorous and relevant design problems using engineering and science concepts within a collaborative learning environment, APB learning challenges students to continually hone their interpersonal skills, creative abilities, and problem solving skills. Students will also learn how to document their work and communicate their solutions to their peers and members of the professional community. It also allows students to develop strategies to enable and direct their own learning, which is the ultimate goal of education.

The following is a summary of the units of study that are included:

1. Energy and Power – Mechanisms, simple machines, energy sources, energy applications, and electrical circuits
2. Materials and Structures – Beam deflection, forces, free body diagrams, truss designs, moments, manufacturing processes, recycling, and materials testing
3. Control Systems – Coding, machine building, testing, troubleshooting, and fluid power (hydraulics)
4. Statistics and Kinematics – probability, statistics, projectile motion, linear motion

TEXTBOOKS: None

REQUIREMENTS: Students are recommended to have taken or be enrolled in a physics course. Lessons will require both independent and group work. The course is predominantly project based and students are expected to solve problems from start to finish without teacher intervention. Students will be required to use various software extensively during the course of this program. Work is submitted both electronically and hard-copy. Students will also learn how to document their work, and communicate their solutions to their peers and members of the professional community.

GRADING PROCEDURES: Grades are determined by a combination of projects, reports, drawings, performance of students' designs, etc., in addition to traditional exams, quizzes and homework.