MONTE VISTA CHRISTIAN SCHOOL
INTD 2520 Principles of Engineering
Course Syllabus

Course Description:
Through problems that engage and challenge, students explore a broad range of engineering topics, including mechanisms and movement, power and control, and automation. Students develop skills in problem solving, research, and design while learning strategies for design process documentation, collaboration, and presentation.

Curricular Mapping:
This course will introduce students to the design process and give ongoing opportunities to apply the design process to solve selected problems. This course will draw upon the skills learned in physical science and algebra. The projects in this course will reinforce concepts that are taught in Chemistry, Physics, and Geometry. This is an introductory course to engineering principles and will prepare them for future design courses in high school (PLTW) and in college.

Course Objectives:
Upon the successful completion of this course the students will be able to:

1. Understand and describe the design process in theory and in application as it is applied to specific design problems.
2. Understand and describe the subject matter of different engineering fields and have a working knowledge of the tools used and the problems that are solved within these fields.
3. Be introduced to robotics and programming, being able to code simple programs and understand the critical nature of programming in control systems.
4. Understand the importance of communication within the field of engineering and improve in the ability to communicate ideas and solutions verbally, visually, and in writing.
5. Apply math and science in real-world and hands-on projects that are fun and engaging.

Text:
There is no textbook for this course.

Prerequisite:
Algebra

Course Outline:

1. Mechanical Engineering - Mechanisms and Movement
    a. Introduction to Vex Modular Building Set

    b. Simple machines and Mechanical Advantage
    c. Compound Machines
    d. Compound Machine Project
2. Electrical Engineering - Power and Control
    a. Energy
    b. Circuits
    c. Motor Power and Control
    d. Remote Control Car Project
3. Robotics - Automation
    a. Introduction to Programming
    b. Autonomous Vehicles
    c. Machine Control Design
    d. Materials Sorter Project
    e. Wireless Control Devices
    f. Battle Bots Project

Grading:

Grade Book Categories		**Semester Weighted Grading Configuration**	
Workspace Stewardship	5%	Quarter	45%
Communication	15%	Quarter	45%
Classwork	30%	Final Exam	10%
Projects	50%		

Explanation of Gradebook Categories:

All student quarter grades will be weighted as follows:

1. Workspace Stewardship 5%. Students are expected to keep their workspace clean and organized. Since we are dealing with many different types of tools (some of which are very small), it is expected that students take ownership in maintenance and care of their workspace and equipment.
2. Communication 10%: A significant aspect of engineering which is often overlooked is the importance of communication. Engineers seldom work in isolation and being able to communicate ideas effectively through pictures, diagrams, and words is paramount.
3. Classwork 30%: Engineering relies heavily on math and science and we will learn and apply specific content from these fields. As an elective course, most students should

have enough time to complete all assignments and tasks in class. The primary emphasis is on exposure to the underlying theory as opposed to mastery.

4. Projects 60%: Projects will make up the vast majority of this course. Projects will be assessed based on the successful ability to solve problems and the efficiency of the solutions.

High School Standard Grading Policy:
Please refer to the policy and procedures posted online in our Parent-Student Handbook.

Class Policies:
The following class policies are non-negotiable. Please see the instructor if you have any concerns with your ability to follow these policies.

1. Tardiness: Class starts at the bell. Students are expected to arrive on time and be prepared to begin class. In many cases, we will be working on projects and we need to take advantage of all of the time that we have.
2. Absences: Making up classwork is the responsibility of the student. The policies set forth in the Parent-Student Handbook will be followed regarding make-up work for any excused absence. It is critical that each student find out what has been missed as soon as possible and plan accordingly.

School Policies and Expected Student Learning Results (ESLRs):

Students are subject to all academic policies of the school as found in the Parent-Student Handbook. Furthermore, it is each student's responsibility to read and follow all academic policies of Monte Vista Christian School. In addition to addressing each ESLR every year, we target a specific ESLR each academic year for particular focus

Tips for the Students:

1. Work together to come up with solutions to specific problems. We are smarter in a group than we are alone. Take advantage of the skills and strengths of the people in your group.
2. Be creative. God is the ultimate creator and he created us in His own image. Creativity is a gift from God. Take advantage of it.
3. Have fun! With each project, find your angle and go for it.