**Mr. Clayton Chaffin**

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**3rd Period Planning**

**Class:** Robotics

**Course Description:**

Robotics is a lab-based course that uses a hands-on approach to introduce the basic concepts of robotics, focusing on the construction and programming of autonomous mobile robots. Course information will be tied to lab experiments; students will work in groups to build and test increasingly more complex mobile robots, culminating in an end-of-semester robot contest. We will be using VEX Robotic Design System as our platform. Students will be divided into groups and complete a variety of robot construction and programming activities within the confines of these groups.

**Course Objectives:**

In this course, students will:

1. Explore the broad scope of robotic applications

2. Learn the basic components and building blocks of robots

3. Develop the robot construction skills

4. Learn to program the robots

5. Program autonomous mobile robots to achieve challenging tasks

**Essential Questions:**

1. How can robotics technology further impact our future in a positive way?

2. What are the required components, factors and skills to build a high-performance functioning robot? 3. How to construct an autonomous mobile robot.

4. How to program an autonomous mobile robot.

**Course Requirements and Materials Needed:**

1. Hardware: VEX Robotics Design System, accessories and tools (provided by school).

2. Software: ROBOTC license (provided by school).

3. 2 Notebooks or 1 Binder (with tabs) for Engineering journal and regular note taking purposes.

4. Scientific or graphing calculator.

Instruction Materials:

1. Teaching ROBOTC for Innovation First Robots, Carnegie Mellon Robotics Academy website: <http://www.robotc.net/vex_full/>.

2. VEX Inventor’s Guide, VEX forum website: <http://curriculum.vexrobotics.com/>

3. VEX Curriculum 2.0, Carnegie Mellon Robotics Academy website: <http://www.education.rec.ri.cmu.edu/roboticscurriculum/vex_online/>.

4. VEX EXP Curriculum, website: [EXP | VEX Education](https://education.vex.com/stemlabs/exp)

5. Instructional Video: Various on-line videos of robotics research.

6. Progress Book: Progress Book provides further learning resources as well as a class outline.

**Course Format:**

1. Lectures.

2. Video and multimedia presentations.

3. Group work and discussions.

4. Laboratory investigations.

5. Group competitions and activities.

6. Mini- and term projects.

7. Homework assignments and assessments.

**Content Outline:**

This course is divided into:

1. Entering the robotics world

a. Introduction to robotics

b. STEM careers

c. Safety and project management

2. Robotics: Mechanics

a. Materials, construction & motion

b. Motors & gears

3. Robotics: Electricity

a. Electricity & batteries

b. Remote controllers

4. Robotics: Sensing & controlling

a. Microcontrollers

b. Sensors

5. Programming: Motion

a. Setup & fundamentals

b. Movements

6. Programming: Sensing & controlling

a. Radio control

b. Sensing

7. Project:

a. Planning

b. Design

c. Implementation

d. Testing

e. Presentation & documentation

8. VEX Challenges

**Expectations:**

1. Attend class daily, on time and ready to work.

2. Participate and contribute to group assignments and projects.

3. Maintain a daily, complete, organized engineering journal.

4. Have all assignments done and submitted when they are due.

5. Review work done each day.

6. Spend an appropriate amount of time preparing for tests.

7. Exercise safety and common sense at all times.

8. Have a mutual respect for fellow students and their right to an education.

Utica High School

Robotics Class

**Student Agreement**

I, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, understand I will have be working with Robots that are

(Student Name)

property of North Fork Local Schools and will act responsibly while using the equipment. I understand that any unauthorized use of Robotics Class equipment may lead to your dismissal from the class, disciplinary action, and/or pursuant to fees for damages to equipment.

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(Student Signature) (Date)

**Parent Agreement**

My signature below certifies that I, parent of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, realize my child will be working with Robots that are property of North Fork Local School District and your student will act responsibly while using the equipment. I understand that any unauthorized use of Robotics Class equipment may lead to his/her dismissal from the class, disciplinary action against my child, and/or pursuant to fees for damages to equipment.

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(Parent Signature) (Date)