Berrien Springs Partnership Syllabus and Instructor Qualifications

**CLASS TITLE: Drone Building
GRADE OR AGE LEVELS:    Grades 5th and up
START DATE: September 7th                            END DATE: January 18th
# WEEKS TOTAL: 17             WEEKS OFF:  3
DAY/TIME REQUIRED: Wednesday 10-11am ADD’L DAYS/WK AVAILABLE:
# HOURS (REQUIRED):      17                         # HOURS (OPTIONAL): 73 (approx.)
TOTAL SEMESTER HOURS POSSIBLE: 90**

**LOCATION/ADDRESS:** Niles STEAM room: 2601 N. 5th Street, Niles, Michigan
**MAIN INSTRUCTOR:** Paul Oblak
**CONTACT INFORMATION:**    **phone:  269-697-0069  email:  poblak@gmail.com   website:** [**https://funlearningcompany.com/**](https://funlearningcompany.com/)

ADDITIONAL REGISTRATION AT SITE REQUIRED?    NO

MAIN INSTRUCTOR QUALIFICATIONS:

36 years as an Information Technology Professional encompassing everything from Mainframe operations and programing through all of the latest technologies including networking, servers, Business Intelligence programming and analysis, etc. Proficient at PC hardware building and diagnosis, etc. I Have taught classes at Lake Michigan College in Windows Servers, Fab Lab, and FIRST Robotics. Served as a CSA (Control Systems Advisor) for several years at FIRST Robotics competitions in Michigan.

I enjoy mentoring young people with the desire to see them reach their full potential as human beings and fully enjoy whatever they choose as a career field.

COURSE DESCRIPTION (complete overview shown on website):
Developing a scientific approach to problems, while learning terminology, problem-solving, and engineering principles through fun hands-on projects; gaining an in-depth understanding of the way UAVs have evolved over time, including how they’re built, operated, and used today.

SYLLABUS/OUTLINE:  weekly breakdown of Project-Based Learning activities

Weeks 1-7: learning about the basics of flight and flying some pre-built drones; testing out various drone designs using Flybrix Drone kits (including multiple types of quadcopters, an octocopter, and a hexcopter).

Weeks 8 & 9: design your own drone competition using the Flybrix Drone kits.

Weeks 10-14: Program CoDrone to complete various challenges using Blockly and Arduino

Week 15: Build your CoDrone remote and program it to control CoDrone

Weeks 16 & 17: Flying and maneuvering through obstacles + completing challenges with your drones.

COURSE OBJECTIVES AND APPROXIMATE TARGET DATES:

After 6 weeks, the students should have a basic understanding of drones, including their uses, various frames and how they impact flight, and basic flight principles.  This includes:

* Pros and cons of various airframe designs – comparing hex frame, quad frame, and octo frame, shorter/longer wings, bent wings, etc. (considerations include battery life, speed, stability, etc)
* Hypothesizing about, and testing, the outcomes of various physical modifications to drones.
* Engineering concepts such as: air resistance, inertia, torque, pivot points, aerodynamics, etc.

By 12 weeks, students should have an introduction to programming their CoDrone in Blockly, and understand + be able to explain some programming concepts, like:

* Loops
* Functions
* Events / Event Listeners

At the end of the semester, students should also understand basic programming in Arduino and feel confident in their ability to fly a drone.

In the second semester, students will focus on four primary goals:

1. Understanding the individual components that make up larger drones, including how to choose the appropriate components and how to ensure they will work together.
2. The ability to solder simple-moderate circuits (including debugging soldering issues/mistakes).
3. Knowledge on the classification, history, and uses of drones and other UAVs, as well as FAA regulations on drone flight + registration and requirements for obtaining a drone pilot license.
4. Familiarizing themselves with some of the topics on the pilot’s test, like drone safety procedures and the effects of wind/weather on drone flight.

STUDENT ASSESSMENT - what will be used to evaluate student progress and/or end of semester pass/fail status?
All classes abide by the following:

1. Student agrees to attend at least 80% of class sessions/lessons offered.  Attendance is kept online and tracked by Partnership staff.  Failure to meet 80% or be on track to meet 80% may result in program discontinuation.
2. The Partnership Student Assessment or Performance Form is filled out by the teacher and turned in to Partnership staff.  The link to this form is found on the web page for this class.  Failing marks for lack of participation, behavior issues, practice time, etc. may result in program discontinuation.

Class-specific assessment:

Our instructor will evaluate each student using Berrien’s evaluation form and passing criteria will be based solely on students attending and actively participating in the class sessions.

Additionally, students will take our course pre/post assessment in Moodle.  (We can provide your teachers with non-editing accounts to see our virtual Moodle courses upon request).

ADDITIONAL RESOURCES: (online, books, video, etc.):

Each student will have their own login with access to our virtual Moodle course in Drone Building.

CLASS POLICIES: ATTENDANCE, BEHAVIOR, WEATHER, ETC.

**Attendance:** attendance is required, and students should notify the instructor in advance of any absence.

**Behavior:** any behavior issues will first be privately brought to the attention of the parent and, should the behavior persist, to the partnership staff.

**Weather:** the classes will be cancelled on any days when Berrien Springs Public Schools are closed.  We will also contact families to remind them of this in the event of a weather-related cancellation.  We will make up any canceled class meetings at a later date.