Berrien Springs Partnership Syllabus and Instructor Qualifications

# **CLASS TITLE:** Intro to Electronics**GRADE OR AGE LEVELS:** **5th – 10th** **START DATE: September 7th                            END DATE: January 18th# WEEKS TOTAL: 17             WEEKS OFF:  3DAY/TIME REQUIRED: Wednesday 1:30-2:30pm 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 OblakCONTACT INFORMATION: phone:  269-697-0069  email:  poblak@gmail.com   website: <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):
learning about electronic components, principles, and terminology through interactive projects and immersive work on challenges as well as videos and lessons of general concepts/examples. Some projects can be completed autonomously by following instructions included in the kits, and on the video lessons (and, of course, asking for help when needed). Students are encouraged to follow their interests and hypothesize about the results of various circuit designs and modifications.

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

Unit 1 (2 weeks): Intro, electricity, conductivity, and insulators vs. conductors

Unit 2 (4 weeks): Using a multimeter & intro to Individual Electrical Components (resistors, capacitors, LEDs & other diodes)

Unit 3 (5 weeks): Current basics (AC vs. DC) & additional electrical components (buttons, switches, transistors, speakers, microphones, & IR sensors).

Unit 4 (3 weeks): Integrated circuits & connecting components in series vs. parallel.

Unit 5 (2 weeks): Mirrors, Light, lasers, and potentiometers

Unit 6 (1 week): Review & making your own circuits.

# COURSE OBJECTIVES AND APPROXIMATE TARGET DATES:

* Circuitry and current flow – short circuits, open/closed circuits (including how buttons and switches are used to open and close circuits), voltage in parallel and series circuits.
* Reading and following instructions, as well as imitating visual representations without written instructions and predicting the outcomes of various modifications.
* AC/DC power – sources, uses, and conversion.
* Putting together and debugging circuitry in snap circuits and using a breadboard.
* Light – including wavelength, frequency, and how much energy is required to emit different colors of light. (ex. which color LED requires the least amount of energy to light up?)
* Sound – including how sound waves travel and are detected/emitted, and how auditory data is transferred and interpreted.
* Electromagnetic fields and how they can be used to convert electrical energy into mechanical energy
* Electronic components and their uses, including:
	+ Resistors – including how resistance is measured and how adding a resistor affects the flow of electricity.
	+ LEDs and other diodes – including how they function and primary uses.
	+ Capacitors – including capacitance, how energy is stored & discharged, and the meaning of conductivity, polarity, & charge.
	+ Microphones and Speakers – how they emit, store, and detect/interpret sounds.
	+ Transistors – including function (at an atomic level as well as a functional level), size, and components + materials (defining semi-conductors, types of doping and valence electrons).
	+ Infrared receivers and remotes – including sources of infrared light and their frequency, and how signals are sent + interpreted using binary codes.
	+ Motors – including their primitive components and how electromagnetic fields and magnets are used to generate motion (including terminology like torque, power, and inertia).

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, Intro to Electronics.

# **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.