



ELECTRONICS ENGINEERING TECHNOLOGY 2020 – 2021 SYLLABUS

PROGRAM INFORMATION

Class hours:

- AM Session – 7:55 to 10:25
- PM Session – 11:10 to 1:40

High School Credits:

- 3.0 CTE/Occ. Ed./Elective
 - Equivalency credit: Algebra 2
 - Prerequisite: Algebra 1

CTE Dual Credit

- Edmonds Community College – Minimum grade of B at SISC
 - SISC 1st Year Course
 - ETEC 150 – Applied Technical Math – 5 Cr
 - ETEC 161 – DC Electronics – 5 Cr
 - SISC 2nd Year Course
 - ETEC 162 – AC & Linear Electronics – 5 Cr
 - ETEC 163 – Digital & Microprocessor Electronics – 6 Cr
- Everett Community College – Minimum grade of B at SISC
 - SISC 1st Year Course
 - MECH 120 – 5 Cr
- Lake Washington Technical College – Minimum grade of B at SISC
 - SISC 1st Year Course
 - ELEC 110 – 6 CR

INSTRUCTOR INFORMATION

- Instructor: Ted Rodriguez, CET, FCC, NISOD (2002)
- Office Hours: 10:25 to 11:10
- Office Location: Bldg. 3, Room 359
- Phone: 425.348.2234
- Email: rodrigueztn@mukilteo.wednet.edu
- Best Way to Contact Me: Email works best in the EET department. I will reply as soon as practical.

PROGRAM DESCRIPTION

This program introduces the four fundamental topics of Voltage, Current, Resistance and Power. This is accomplished through a combination of academic and hands-on experiences. Each assignment is typically one to two weeks long with a capstone soldering certification project assigned during the 4th quarter.

First year students work on circuit configurations which illustrate the relationship between the four topics. Electrical equipment and tools which facilitate the learning process are covered as the student works at the lab bench. Math through linear and vector Algebra is used in most of the circuit designs. Calculus fundamentals dealing with Integration and Differentiation are introduced and demonstrated in analyzing your advance wave shaping circuits.

Second year students are exposed to sensor technology, circuits, and systems. These sensors are applied to analog, digital and industrial control applications. All necessary math is covered in the design and implementation of these applications as well as the necessary controller programming.

The 2020-2021 school year in this department will see more Mechatronics applications in the curriculum. The areas of Biometrics, environmental sensors, fiber optics and 3D printing have been added to the program. Solar, wind and hydro alternative energy-based content will continue as STEM related projects. We will also continue our work with the National Science Foundation (NSF) guitar building project this year. All the details implemented in building your guitars will meet the NSF project requirements and specifications. The guitar building project is totally student based and in compliance with the NSF Guitar Building Institute. If you have a desire to construct a professional quality musical instrument, consider building your own guitar or bass. Prices range from \$139.00 for a three-pickup Fender Stratocaster model guitar to over \$200.00 for a full kit which you assemble and customize from fretboard to headstock. Shipping and WA state sales tax will be added to the base price of your guitar. Some versions of these instruments may be subject to US tariff rules and regulations. These instruments will be yours to keep and enjoy. You can go online to Sinclair Community College NSF STEM guitar project site in Akron, Ohio at <http://www.guitarbuilding.org>, select Storefront, and then Products to see the different models and available options for your guitars. We will plan to order the guitar kits as early in the year as practical. Delivery times from Sinclair CC vary from three to six weeks due to heavy global demand.

PROGRAM MATERIALS

COMPONENTS AND TEXTS

- All electronic components and data specification sheets will be provided by the department in digital format.
- Lessons in Electricity, Volumes: 1 through 6, Tony Kuphaldt, is available as an eBook at no charge to you. I recommend you keep a 4 to 8 GB flash drive handy for your digital downloads. Please download your eBook during your first week of class from the main computer at the front of the classroom. If you wish to download your eBooks directly to your computer from the Internet, use the address shown here:
<http://www.ibiblio.org/kuphaldt/electricCircuits/>
- If you find it difficult to read from a computer screen, there are textbooks in the department which are also available to you. You may check these out if you are more comfortable reading from a textbook than from a computer screen.
- There will be additional eBooks and digital files added to the computer located at the front of the classroom. These files are component datasheets and used during your circuit design.

LAB FEE

- First and Second Year Students.....\$40.00
- The lab fee in the EET department is used to cover the cost of your CPR and First Aid Certification. The cost of the solder certification capstone project will also be offset by your lab fee.

LEARNING TARGETS/OBJECTIVES

Below is a partial list of the activities you will be able to perform upon completion of this program sequence with a grade of B (3.00 GPA) or better. You will be able to:

1. Determine and identify unsafe safety practices and immediately apply corrective action.
2. Communicate safety concerns to your peers, class leaders and teacher.
3. Obtain your First Aid, CPR and AED certification.
4. Apply mathematic principles (Algebra) to AC and DC resistive circuit analysis.
5. Apply mathematic principles (Trigonometry) to AC reactive circuit analysis.
6. Use your Digital Multimeter (DMM), oscilloscope, function generator and power supply system in analyzing your electronic circuits.
7. Use Ohm's Law to analyze resistance, voltage and current in AC and DC circuits.
8. Identify the Color Code used in the field of electronics.
9. Determine the electrical value, power capacity, and tolerance of a resistor from its color code and physical size.
10. Locate and identify components and their function in a schematic diagram.
11. Prepare a circuit layout based on a schematic diagram of that circuit.
12. Identify solid state components by their electrical or electronic schematic symbol.
13. Apply mathematic equations to predict the performance of an audio amplifier.
14. Utilize your test instrumentation to verify proper circuit operation.
15. Use manufacturer's datasheets and information notices to obtain device specifications.
16. Build your guitars to meet or exceed the specifications set by the National Science Foundation.
17. Apply Mechatronics principles to analog and digital circuit design.
18. Use analog to digital (ADC) and digital to analog (DAC) conversion techniques in system computer interfacing.
19. Incorporate environmental, narrow and wide spectrum sensors in circuit applications.
20. Use electronics and mechatronics principles in designing motor control circuits.
21. Understand the concept of positive and negative feedback in automatic control systems.
22. Compare free-air laser and fiber optic light communication systems.
23. Use C or C-variant language for programming applications.
24. Investigate the types of Biometric sensors.
25. Apply STEM principles to your projects.
26. Apply Material Science (MS) fundamentals to the field of Electronics.
27. Review Semiconductor component manufacturing technology as a function of MS.

CERTIFICATION OPPORTUNITIES

This course assesses student achievement of these specific outcomes and offers an opportunity for students to earn a Sno-Isle TECH Skills Center certificate of achievement with PCB Plated Through Hole soldering proficiency indicated. A Precision Exam Pre-Test is administered during the second week of 1st Quarter followed by the Post-Test during the end of 4th Quarter. Career skills certification is awarded upon successful attainment of proficiency in the area of Electronics Technology. The Precision Exam certification assessment is administered during the 4th quarter. The 21st Century Success Skills (soft skills) Exam will also be administered during the 4th quarter of the school year. The Career skills certification documents are endorsed by the Superintendent of Public Instruction of the State of Washington and the Director of the Sno-Isle TECH Skills Center.

ASSIGNMENTS AND GRADING

ASSESSMENT

The grading in this program will be based on the following criteria:

1. Laboratory exercises.....50%
2. Written and Lab examinations.....25%
3. Professional work ethics.....25%
(attendance, punctuality, class participation, leadership traits, lab bench condition)

Grades will be calculated automatically by *Qmlative*, our Student Management System (SMS).

- New assignments begin every two weeks preceded by a classroom discussion. They are due on Friday of the second week by the end of class
- Make-up or late work is accepted if prior arrangements have been discussed.
- Grades are posted on the SMS on Mondays. You and your parents can view your grades and progress by accessing the online SMS system.

COURSE EXPECTATIONS

- As you progress in your course of study in the department, you will be involved in more and more direct application projects. You will be able to select an area of application. Robotics and control systems applications are one choice. Analog and digital audio applications are another. Computer controlled systems and programming is yet another. If you have a project or specific direction you have always wanted to pursue, you will have that opportunity.
- You are expected to turn in your assignments on time.
- Unless a mitigating issue requires your access to your cell phone during class, the use of cell phones is not permitted in the department when class is in session.

“Sno-Isle Tech Skills Center is administered by Mukilteo School District and follows MSD School Board Policies and Procedures.”

Mukilteo School District does not discriminate in any programs or activities on the basis of sex, race, creed, religion, color, national origin, age, veteran or military status, sexual orientation, gender expression or identity, disability, or the use of trained dog guide or service animal and provides equal access to the Boy Scouts and other designated youth groups. The following employees have been designated to handle questions and complaints of alleged discrimination: Civil Rights Coordinator and Title IX Coordinator Bruce Hobert (425-356-1319), hobertbl@mukilteo.wednet.edu, Section 504 Coordinator Lisa Pitsch (425-356-1277), pitschla@mukilteo.wednet.edu, and the ADA/Access Coordinator Karen Mooseker (425-356-1330), moosekerkw@mukilteo.wednet.edu. Address: 9401 Sharon Drive in Everett, WA. Inquiries regarding ADA/Access issues at Sno-Isle TECH Skills Center should be directed to Wes Allen, Director (425-348-2220) allenwr@mukilteo.wednet.edu. Address: 9001 Airport Road in Everett, WA 98204