

**ELECTRONICS/ELECTRICITY SYLLABUS**

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**COURSE DESCRIPTION:**

This course is designed to give students an understanding of DC and AC theory, test equipment, and circuit design. Students will learn wiring and safety through lecture, worksheets, and hands-on experience how these components function together. Troubleshooting skills are developed through assembly of circuits, both simple and advanced. It is also intended to enhance troubleshooting skills used in everyday practice.

1. Relate the practical applications to classroom learning experiments and demonstrations.
2. To develop habits of self-reliance, self discipline, and resourcefulness.
3. To establish a skills and knowledge level sufficient for an entry level job
4. To develop the proper use of employability skills to sell yourself to a prospective employers.

**COURSE GOALS & OBJECTIVES:****Alternative Energy**

- Design & build your own micro wind turbine- class competition
- Learn and use main-stream components used in wind & solar power generation
- Take part in building electric vehicles & go karts, as well as self-sustainable buildings

**Robotics**

- Learn about industry standard robotics components using the Lego Mindstorm platform
- Use professional engineering software to bring the robot to life
- Robot challenges and competitions

**Programming**

- Industry standard PLC and programming for machine control
- Use Arduino and Raspberry Pi to building small projects

**Analyzing DC Circuit**

- Identify insulators and conductors
- Understand resistor color code
- Understand electronics symbols
- Measure voltage
- Measure current
- Measure resistance
- Solve using Ohms law/Watts Law
- Understand series circuits
- Understand magnetism
- Understand relay circuits
- Understand switches
- Understand transistors
- Understand 741 OP Amps

**Analyzing AC Circuits**

- Calculate RC, RL & RLC Circuits
- Calculate apparent power, real power, and reactive power
- Understanding basic transformers

**Components**

- Understand how capacitors & inductors operate in AC & DC circuits

**Motors**

- Learn difference between AC & DC motors and how they function

**Testing Equipment Operation**

- Perform digital multi-meter measurements
- Perform DC measurement with Oscilloscope
- Perform AC measurement with Oscilloscope
- Perform frequency measurement with Oscilloscope

**Soldering**

- Understand types of solder
- Perform soldering with mechanical and electrical integrity
- Perform de-soldering
- Repair cold solder joints.
- Perform proper Splicing Techniques

**Understanding Digital Electronics**

- Understand AND/NAND gates
- Understand or/NOR gates
- Understand the 555 timer
- Build a touch activated switch
- Understand seven segments displays

**Residential Electrical Wiring**

- Identify Electrical Symbols
- Perform proper box to box wiring technique
- Set-up basic lighting circuits
- Set-up basic outlet circuits
- Set-up 3-way switched circuit
- Set-up 4-way switched circuit
- Troubleshoot Electrical wiring circuits
- Understand over current protection
- Understand proper grounding procedures

**Safety**

- Understand human tolerance of electricity
- Understand circuit ground
- Understand equipment ground
- Using fusing and circuit breakers rules
- Know tool hazards
- Know soldering safety and principles
- Follow all safety in the workplace procedures

**ATTENDANCE  
POLICY AND  
GRADE  
REDUCTION**

The Tuscola Technology Center places a high priority on attendance because the attendance pattern established by the student in school often sets an attendance pattern for employment. To benefit from the primary purpose of the school experience, it is essential that each student maintain regular and punctual attendance. Class attendance is necessary for learning and academic achievement as well as for developing the habits of punctuality, dependability, and self-discipline demanded by business and industry. Regular attendance in the Technology Center's labs is essential to allow students to fully

participate in class instruction, discussion and skill development. Absences beyond eight days per semester are considered excessive. Both excused and unexcused absences are charged in the student total.

**STUDENT ASSESSMENT**

A	100	93
A-	92.99	90
B+	89.99	87
B	86.99	83
B-	82.99	80
C+	79.99	77
C	76.99	73
C-	72.99	70
D+	69.99	67
D	66.99	63
D-	62.99	60
E	59.99	0

As a part of the evaluation process, every nine weeks students will receive a Student Achievement Record of Progress (SARP). This record will indicate the achievement of the individual student in the particular duties and related tasks they have received instruction and practice in. The following indicates the levels of achievement used by all career-technical program areas at Tuscola Technology Center to evaluate students:

- Level 1: Student has been exposed to the task.
- Level 2: Task has been accomplished with assistance
- Level 3: Task has been accomplished according to criteria
- Level 4: Ability to teach or demonstrate the task to other.

**CERTIFICATE REQUIREMENTS CERTIFICATIONS**

Students are introduced to many areas of Electricity/Electronics that will help them in future certification such as being a license electrician or in the Electronic Technician Association.

**ARTICULATED CREDIT**

The TTC Electronics program currently has articulation agreements with Delta Community College, Davenport University, Mott Community College and Baker College

*The instructor reserves the right to make adjustments to this syllabus as needed.*