Class: **Electronics and Robotics**

Instructor: Mr. Joseph Minnick - Room # D-102

Southfield Public Schools

Email: Minnickjj@Southfield.k12.mi.us

Phone: (248) 746-8687

Course Description

Robotics is a year course which students study and apply concepts of engineering and machine technology. Mobile Robotics and Mechatronics will be the emphasis of study while students work to build electronic and mechanical systems. Students are encouraged to join the school’s FIRST\* Robotics Team while taking this class.

\*FIRST -For inspiration and recognition of Science and Technology

**Grading Procedure:**

Grades will be based on a percentage points system. The total amount of points each student earns will be divided by the total amount of assignments (each assignment is worth a possible 100 points/percent). The amount earned will be divided by amount possible using the following scale. Homework will be required 2 days per week. I day will be allowed for makeup for every day of **excused** absence.

# Grading Scale

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A+ 98-100% | B+ 88-89% | C+ 78-79% | D+ 68-69% | F 00-59% |
| A 93-97% | B 83-87% | C 73-77% | D 63-67% |  |
| A- 90-92% | B- 80-82% | C- 70-72% | D- 60-62% |  |

Assessment Methods

* Timely and successful completion of authentic performance tasks and projects.
* Professional Lab Performance. Safety-Organization-Professional Work Ethic.
* Teacher observation using *SCANS* relatedevaluation forms.
* Scores on written assignment.
* Pretest/Post test scores Quiz scores, Exam scores
* Every rubric is worth 100 pts Final Exam is worth 20%
* FIRST ROBOTICS TEAM INVOLVEMENT

## Behavioral Expectations/Rules

\*\*\*Adhere to SPS District Policies outlined in the Parent/Student Handbook

\* Follow my directions. Follow administrative directions.

\* Keep hands, feet, and objects to yourself.

\* Treat yourself and others with respect.

\* Have all needed materials and be in your assigned seat before the bell rings.

**\*** SLANT (Sit up-Lean forward-Ask-Nod & Talk to Teacher)

\* **Food/candy, drinks and gum are not allowed in the classroom at any time.**

# **Additional Policies**

1. There will be significant machine and tool usage in this class; Safety will be your top priority.

2. Push in chairs and clean your area before leaving class

3. Respect yourself, your peers, and adults- **listen when instructions are being given to you**. In other words **PAY ATTENTION**

4. Always ask for assistance from me. Never be afraid to ask a question.

5. Always take pride in your school, value your education.

6. Game playing is not allowed on any computer at any time. If you are caught playing games at any time you will receive F (0) for the current assignment.

\* Any student who continues to break rules causes dangerous situations, steals or needs continuous parental contact will have a difficult time in this class.

You will be required to **remove the bottom** of this page, have it signed by a parent/guardian and returned to Mr. Minnick

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I\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ have read, fully understand and agree with the Procedures for Mr. Minnick’s class.

 *Print name*

X\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ X\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 *Student signature Parent signature*

Conceptual Outline for Electronics and Robotics
Southfield High School

Policy/Procedures and Fundamentals Course Description

Robotic Fundamentals

“Five Basics”

Industrial Robotics VS Mobile Robotics

What is FIRST?

Safety Procedures and Machine Basics

Lab-1 Measurement

Precision Measurement

Quality Control

Safety Procedures

Care of Technology

Safety with Machines

Safety with Electricity

Band Saw, Drill Press, and Vise, Hand tools

Material Basics and Material Processing

Forming Process

Turning/Boring, Milling, Drilling Grinding, Slotting/Planning

Lab-2 Material Processing

Fundamentals of Electricity

Ohm’s Law, Elements and Matter the Science of Electricity

AC/DC components and schematics

Lab-3 the Digital Multi Meter

Electricity and Electronics

Resistor Color Code

“Jerry” Chapters1-8

“Tronix” 1-11

Magnetism

Electromagnetism

Relays

Solenoid

Motors & Actuators

Generators

Lab – 4Electric Motor

Generators and Review

Batteries, Capacitance, Energy

Lab-5 the Generator

Circuitry

Hydraulics, Pneumatics, Electronics

Schematic Symbols

CAD Circuit Maker Software

Lab-6 Circuit Design

Lab-7 Circuit Construction

Drive Systems

Gears, Pulleys, Bearings, Mechanisms Chain Drive, Belt Drive, Shafts I/O

Directional Systems

Torque Conversion

Lab 8 Mechanism Mock-up

Manipulators/Kinematics

End effectors

Linkage Systems

Lab 9 Four Bar Mock-up

Structures

Frame Design, Materials, Tubes and Beams

Lab-10 Tower Challenge

Fasteners

Tap and Die

Fastener Identification

Lab- 11 Drill and Tap

Problem Solving and Innovation

Testing, Troubleshooting

Basic Configuration of Mobile Robotics

Project Mgt.

Open Issues Tracking

FEMA-Failure Mode Effect Assessment module

US FIRST Control Panel

H-bridge control, Pulse Width Modulation

Motor Control Case Study

Sensors

Programming

PBASIC
C programming Lego

Labview tutorial

Lab 12- Mini-Bot Competition