Name: Robert Lefrandt	Grading Quarter: 2	Week Beginning: 08 12/04/2023
School Year: 2023-24	Subject: Robotics	

Monday	Notes: 12/04/2023 Check for VEX Game Elements arrival/Register Robotic Assemblies Mechtronics Engineering: ReEngineering Reverse Engineering Structural Chassis frame body Mechanical (Motion) Gear: Box, train, parallel (linear) stack (vertical), ratio, torque speed Electrical Chemical electrochemical Physical Magnetism Batteries Software Block PLC ladder logic, CNC, Python, C++, Sensors Bump/touchDistance Light Camera Physical Computing AI Data Collect DataAnalyze Collaborate with schools, 'Industry Professional Community	*****Hold Robotics Team/Club Meeting this week to discuss:** • **Review for Test/**<u>**Az CTE Assessment**</u> Blocks (1,4) Dec. 18-19, 2023 • ***Register Teams VRC Competiton 1/6/24 @ Whiteriver, Alchesay High School** • ***Diamond Back Robotics Competition Spring/Summer** • *PO/Paid/Check Registration VEX V5 Team(s)/VEX Prof+ Access • Discuss Robotics 11/17-18/23 Competition @ Whiteriver, Chief Alchesay Center • Battlebot Competition with Show Low High School • Download Libraries for Thonny IDE on workstations (laptops?) for Pico W Kit • <u>SunFounder Raspberry Pi Pico W Ultimate Starter Kit with Online Tutorials, 450+ Items, 117 Projects, MicroPython, Piper Make and C/C++ (Compatible with Arduino IDE)</u> **Objective:** Apply basic engineering principles and technical skills for... artificial intelligent management ...[automation]...the principles of robotics, design, operational testing, system maintenance, repair procedures, robot computer systems, and control languages. *(AZ CTE Automation & Robotics-Program Description)* • PERFORM ELECTRICAL AND ELECTRONIC TASKS • ANALYZE PROGRAMMABLE LOGIC CONTROLLER (PLC) SYSTEMS • PERFORM DRAFTING TASKS-Make dimensional CAD drawings (e.g., 2D and 3D) • DESCRIBE THE OPERATION AND USE OF VARIOUS FORMS OR ELECTRICAL MOTORS • Explain the operation and use of DC motors in automation controls • PERFORM MECHANICAL SYSTEMS LINKAGES TASKS • APPLY SENSOR SOLUTIONS • DEMONSTRATE SAFE AND PROPER USE OF ELECTRONIC AND OTHER LABORATORY EQUIPMENT, TOOLS, AND MATERIALS **Lesson Overview:** <u>1st Semester Students:</u> • Login to VEX Certification Accounts: • VEX V5, Block, Python Programming, Workcell • Continue building VEX V5 Robots: Striker for Over/Under Competition Coding-Block/Python/C/C++ Sensors • Bump/touch, Distance, Line Tracker, Camera, AI, Data Analysis <u>2nd Semester Plus+ Students:</u> • Login to VEX Certification Accounts: • VEX V5, Block,Python Programming, Workcell **Customizing Robots and Parts** • **Tinkercade**/Fusion 360, FreeCad(Python coding) • 3D Modeling, **Electric circuits**, Arduino IDE – C/Python Code Workflow Process: Protyping: 2D Sketch > 3D Modeling > 3D Settings > 3D Printing • Inkscape > **Tinkercad** > Ultimaker Cura > Ultimaker (*print Key fob) *Autodesk Fusion 360/Solidworks: Combine 2d Sketch/3D Modeling • Raspberry Pi – Pico Bluetooth/WiFi, Python Precision Machining • Manual/Traditional - Mill and Drill CNC – ComputerNumeric Control –G/M Code	Academic Standards: AZ_CTE Automation & Robotics Tech-Standards STANDARD 2.0 PERFORM ELECTRICAL AND ELECTRONIC TASKS STANDARD 4.0 ANALYZE PROGRAMMABLE LOGIC CONTROLLER (PLC) SYSTEMS STANDARD 7.0 PERFORM DRAFTING TASKS 7.5 Make dimensional CAD drawings (e.g., 2D and 3D) STANDARD 5.0 DESCRIBE THE OPERATION AND USE OF VARIOUS FORMS OR ELECTRICAL MOTORS 5.2 Explain the operation and use of DC motors in automation controls STANDARD 6.0 PERFORM MECHANICAL SYSTEMS LINKAGES TASKS STANDARD 10.0 APPLY SENSOR SOLUTIONS STANDARD 13.0 DEMONSTRATE SAFE AND PROPER USE OF ELECTRONIC AND OTHER LABORATORY EQUIPMENT, TOOLS, AND MATERIALS

Tuesday	Notes: 12/05/2023 Robotic Assemblies Mechatronics Engineering: Re-Engineering Reverse Engineering Structural Chassis frame body Mechanical (Motion) Gear: Box, train, parallel (linear) stack (vertical), ratio, torque speed Electrical Chemical electrochemical Chemical Batteries Magnetism Computer Sci. Hardware/Software Block PLC ladder logic, CNC, Python, C++, Sensors Bump/touch Distance Light Camera Physical Computing AI Data Collect DataAnalyze Collaborate with schools, 'Industry Professional-Community	*****Hold Robotics Team/Club Meeting this week to discuss:** • **Review for Test/**<u>**Az CTE Assessment**</u> Blocks (1,4) Dec. 18-19, 2023 • ***Register Teams VRC Competiton 1/6/24 @ Whiteriver, Alchesay High School** • ***Diamond Back Robotics Competition Spring/Summer** • *PO/Paid/Check Registration VEX V5 Team(s)/VEX Prof+ Access • Discuss Robotics 11/17-18/23 Competition @ Whiteriver, Chief Alchesay Center • Battlebot Competition with Show Low High School • Download Libraries for Thonny IDE on workstations (laptops?) for Pico W Kit • <u>SunFounder Raspberry Pi Pico W Ultimate Starter Kit with Online Tutorials, 450+ Items, 117 Projects, MicroPython, Piper Make and C/C++ (Compatible with Arduino IDE)</u> **Objective:** Apply basic engineering principles and technical skills for... artificial intelligent management ...[automation]...the principles of robotics, design, operational testing, system maintenance, repair procedures, robot computer systems, and control languages. *(AZ CTE Automation & Robotics-Program Description)* • PERFORM ELECTRICAL AND ELECTRONIC TASKS • ANALYZE PROGRAMMABLE LOGIC CONTROLLER (PLC) SYSTEMS • PERFORM DRAFTING TASKS-Make dimensional CAD drawings (e.g., 2D and 3D) • DESCRIBE THE OPERATION AND USE OF VARIOUS FORMS OR ELECTRICAL MOTORS • Explain the operation and use of DC motors in automation controls • PERFORM MECHANICAL SYSTEMS LINKAGES TASKS • APPLY SENSOR SOLUTIONS • DEMONSTRATE SAFE AND PROPER USE OF ELECTRONIC AND OTHER LABORATORY EQUIPMENT, TOOLS, AND MATERIALS **Lesson Overview:** <u>1st Semester Students:</u> • Login to VEX Certification Accounts: • VEX V5, Block, Python Programming, Workcell • Continue building VEX V5 Robots: Striker for Over/Under Competition Coding-Block/Python/C/C++ Sensors • Bump/touch, Distance, Line Tracker, Camera, AI, Data Analysis <u>2nd Semester Plus+ Students:</u> • Login to VEX Certification Accounts: • VEX V5, Block,Python Programming, Workcell **Customizing Robots and Parts** • **Tinkercade**/Fusion 360, FreeCad(Python coding) • 3D Modeling, **Electric circuits**, Arduino IDE – C/Python Code Workflow Process: Protyping: 2D Sketch > 3D Modeling > 3D Settings > 3D Printing • Inkscape > Tinkercad > Ultimaker Cura > Ultimaker (*print Key fob) *Autodesk Fusion 360/Solidworks: Combine 2d Sketch/3D Modeling • Raspberry Pi – Pico Bluetooth/WiFi, Python Precision Machining • Manual/Traditional - Mill and Drill CNC – ComputerNumeric Control –G/M Code	Academic Standards: AZ_CTE Automation & Robotics Tech-Standards STANDARD 2.0 PERFORM ELECTRICAL AND ELECTRONIC TASKS STANDARD 4.0 ANALYZE PROGRAMMABLE LOGIC CONTROLLER (PLC) SYSTEMS STANDARD 7.0 PERFORM DRAFTING TASKS 7.5 Make dimensional CAD drawings (e.g., 2D and 3D) STANDARD 5.0 DESCRIBE THE OPERATION AND USE OF VARIOUS FORMS OR ELECTRICAL MOTORS 5.2 Explain the operation and use of DC motors in automation controls STANDARD 6.0 PERFORM MECHANICAL SYSTEMS LINKAGES TASKS STANDARD 10.0 APPLY SENSOR SOLUTIONS STANDARD 13.0 DEMONSTRATE SAFE AND PROPER USE OF ELECTRONIC AND OTHER LABORATORY EQUIPMENT, TOOLS, AND MATERIALS

Wednesday

Notes:
12/06/2023

Robotic Assemblies Mechtronics

Engineering: ReEngineering Reverse Engineering

Structural Chassis frame body

Mechanical (Motion) Gear: Box, train, parallel (linear) stack (vertical), ratio, torque speed

Electrical Chemical electrochemical

Physical Magnetism Batteries

Software Block PLC ladder logic, CNC, Python, C++,

Sensors Bump/touchDistance Light Camera

Physical Computing

AI Data Collect DataAnalyze

Collaborate with schools, 'Industry Professionals Community

*****Hold Robotics Team/Club Meeting this week to discuss:**

- **Review for Test/**Az CTE Assessment** Blocks (1,4) Dec. 18-19, 2023
- ***Register Teams VRC Competiton 1/6/24 @ Whiteriver, Alchesay High School**
- ***Diamond Back Robotics Competition Spring/Summer**
- *PO/Paid/Check Registration VEX V5 Team(s)/VEX Prof+ Access
- Discuss Robotics 11/17-18/23 Competition @ Whiteriver, Chief Alchesay Center
- Battlebot Competition with Show Low High School
- Download Libraries for Thonny IDE on workstations (laptops?) for Pico W Kit
- SunFounder Raspberry Pi Pico W Ultimate Starter Kit with Online Tutorials, 450+ Items, 117 Projects, MicroPython, Piper Make and C/C++ (Compatible with Arduino IDE)

Objective:

Apply basic engineering principles and technical skills for... artificial intelligent management ...[automation]...the principles of robotics, design, operational testing, system maintenance, repair procedures, robot computer systems, and control languages.
(AZ CTE Automation & Robotics-Program Description)

- PERFORM ELECTRICAL AND ELECTRONIC TASKS
- ANALYZE PROGRAMMABLE LOGIC CONTROLLER (PLC) SYSTEMS
- PERFORM DRAFTING TASKS-Make dimensional CAD drawings (e.g., 2D and 3D)
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- PERFORM MECHANICAL SYSTEMS LINKAGES TASKS
- APPLY SENSOR SOLUTIONS
- DEMONSTRATE SAFE AND PROPER USE OF ELECTRONIC AND OTHER LABORATORY EQUIPMENT, TOOLS, AND MATERIALS

Lesson Overview:

1st Semester Students:

- Login to VEX Certification Accounts:
- VEX V5, Block, Python Programming, Workcell
- Continue building VEX V5 Robots: Striker for Over/Under Competition

Coding-Block/Python/C/C++

Sensors

- Bump/touch, Distance, Line Tracker, Camera, AI, Data Analysis

2nd Semester Plus+ Students:

- Login to VEX Certification Accounts:
- VEX V5, Block,Python Programming, Workcell

Customizing Robots and Parts

- **Tinkercade**/Fusion 360, FreeCad(Python coding)
  - 3D Modeling, **Electric circuits**, Arduino IDE – C/Python Code

Workflow Process: Protyping: 2D Sketch > 3D Modeling > 3D Settings > 3D Printing

- Inkscape > **Tinkercad** > Ultimaker Cura > Ultimaker (*print Key fob)

*Autodesk Fusion 360/Solidworks: Combine 2d Sketch/3D Modeling

- Raspberry Pi – Pico Bluetooth/WiFi, Python

Precision Machining

- Manual/Traditional - Mill and Drill

CNC – ComputerNumeric Control –G/M Code

Thursday	Notes: 12/07/2023 Robotic Assemblies Mechtronics Engineering: ReEngineering Reverse Engineering Structural Chassis frame body Mechanical (Motion) Gear: Box, train, parallel (linear) stack (vertical), ratio, torque speed Electrical Chemical electrochemical Physical Magnetism Batteries Software Block PLC ladder logic, CNC, Python, C++, Sensors Bump/touchDistance Light Camera Physical Computing AI Data Collect DataAnalyze Collaborate with schools, 'Industry Professionals Community	*****Hold Robotics Team/Club Meeting this week to discuss:** • **Review for Test/**<u>**Az CTE Assessment**</u> Blocks (1,4) Dec. 18-19, 2023 • ***Register Teams VRC Competiton 1/6/24 @ Whiteriver, Alchesay High School** • ***Diamond Back Robotics Competition Spring/Summer** • *PO/Paid/Check Registration VEX V5 Team(s)/VEX Prof+ Access • Discuss Robotics 11/17-18/23 Competition @ Whiteriver, Chief Alchesay Center • Battlebot Competition with Show Low High School • Download Libraries for Thonny IDE on workstations (laptops?) for Pico W Kit • <u>SunFounder Raspberry Pi Pico W Ultimate Starter Kit with Online Tutorials, 450+ Items, 117 Projects, MicroPython, Piper Make and C/C++ (Compatible with Arduino IDE)</u> **Objective:** Apply basic engineering principles and technical skills for... artificial intelligent management ...[automation]...the principles of robotics, design, operational testing, system maintenance, repair procedures, robot computer systems, and control languages. *(AZ CTE Automation & Robotics-Program Description)* • PERFORM ELECTRICAL AND ELECTRONIC TASKS • ANALYZE PROGRAMMABLE LOGIC CONTROLLER (PLC) SYSTEMS • PERFORM DRAFTING TASKS-Make dimensional CAD drawings (e.g., 2D and 3D) • DESCRIBE THE OPERATION AND USE OF VARIOUS FORMS OR ELECTRICAL MOTORS • Explain the operation and use of DC motors in automation controls • PERFORM MECHANICAL SYSTEMS LINKAGES TASKS • APPLY SENSOR SOLUTIONS • DEMONSTRATE SAFE AND PROPER USE OF ELECTRONIC AND OTHER LABORATORY EQUIPMENT, TOOLS, AND MATERIALS **Lesson Overview:** <u>1st Semester Students:</u> • Login to VEX Certification Accounts: • VEX V5, Block, Python Programming, Workcell • Continue building VEX V5 Robots: Striker for Over/Under Competition Coding-Block/Python/C/C++ Sensors • Bump/touch, Distance, Line Tracker, Camera, AI, Data Analysis <u>2nd Semester Plus+ Students:</u> • Login to VEX Certification Accounts: • VEX V5, Block,Python Programming, Workcell **Customizing Robots and Parts** • **Tinkercade**/Fusion 360, FreeCad(Python coding) • 3D Modeling, Electric circuits, Arduino IDE – C/Python Code Workflow Process: Protyping: 2D Sketch > 3D Modeling > 3D Settings > 3D Printing • Inkscape > **Tinkercad** > Ultimaker Cura > Ultimaker (*print Key fob) *Autodesk Fusion 360/Solidworks: Combine 2d Sketch/3D Modeling • Raspberry Pi – Pico Bluetooth/WiFi, Python Precision Machining • Manual/Traditional - Mill and Drill CNC – ComputerNumeric Control –G/M Code	Academic Standards: AZ_CTE Automation & Robotics Tech-Standards STANDARD 2.0 PERFORM ELECTRICAL AND ELECTRONIC TASKS STANDARD 4.0 ANALYZE PROGRAMMABLE LOGIC CONTROLLER (PLC) SYSTEMS STANDARD 7.0 PERFORM DRAFTING TASKS 7.5 Make dimensional CAD drawings (e.g., 2D and 3D) STANDARD 5.0 DESCRIBE THE OPERATION AND USE OF VARIOUS FORMS OR ELECTRICAL MOTORS 5.2 Explain the operation and use of DC motors in automation controls STANDARD 6.0 PERFORM MECHANICAL SYSTEMS LINKAGES TASKS STANDARD 10.0 APPLY SENSOR SOLUTIONS STANDARD 13.0 DEMONSTRATE SAFE AND PROPER USE OF ELECTRONIC AND OTHER LABORATORY EQUIPMENT, TOOLS, AND MATERIAL

Friday	Notes: 12/08/2023 Robotic Assemblies Mechtronics Engineering: ReEngineering Reverse Engineering Structural Chassis frame body Mechanical (Motion) Gear: Box, train, parallel (linear) stack (vertical), ratio, torque speed Electrical Chemical electrochemical Physical Magnetism Batteries Software Block PLC ladder logic, CNC, Python, C++, Sensors Bump/touchDistance Light Camera Physical Computing AI Data Collect DataAnalyze Collaborate with schools, 'Industry ProfessionalsCommunity	*****Hold Robotics Team/Club Meeting this week to discuss:** • **Review for Test/**<u>**Az CTE Assessment**</u> Blocks (1,4) Dec. 18-19, 2023 • ***Register Teams VRC Competiton 1/6/24 @ Whiteriver, Alchesay High School** • ***Diamond Back Robotics Competition Spring/Summer** • *PO/Paid/Check Registration VEX V5 Team(s)/VEX Prof+ Access • Discuss Robotics 11/17-18/23 Competition @ Whiteriver, Chief Alchesay Center • Battlebot Competition with Show Low High School • Download Libraries for Thonny IDE on workstations (laptops?) for Pico W Kit • <u>SunFounder Raspberry Pi Pico W Ultimate Starter Kit with Online Tutorials, 450+ Items, 117 Projects, MicroPython, Piper Make and C/C++ (Compatible with Arduino IDE)</u> **Objective:** Apply basic engineering principles and technical skills for... artificial intelligent management ...[automation]...the principles of robotics, design, operational testing, system maintenance, repair procedures, robot computer systems, and control languages. *(AZ CTE Automation & Robotics-Program Description)* • PERFORM ELECTRICAL AND ELECTRONIC TASKS • ANALYZE PROGRAMMABLE LOGIC CONTROLLER (PLC) SYSTEMS • PERFORM DRAFTING TASKS-Make dimensional CAD drawings (e.g., 2D and 3D) • DESCRIBE THE OPERATION AND USE OF VARIOUS FORMS OR ELECTRICAL MOTORS • Explain the operation and use of DC motors in automation controls • PERFORM MECHANICAL SYSTEMS LINKAGES TASKS • APPLY SENSOR SOLUTIONS • DEMONSTRATE SAFE AND PROPER USE OF ELECTRONIC AND OTHER LABORATORY EQUIPMENT, TOOLS, AND MATERIALS **Lesson Overview:** <u>1st Semester Students:</u> • Login to VEX Certification Accounts: • VEX V5, Block, Python Programming, Workcell • Continue building VEX V5 Robots: Striker for Over/Under Competition Coding-Block/Python/C/C++ Sensors • Bump/touch, Distance, Line Tracker, Camera, AI, Data Analysis <u>2nd Semester Plus+ Students:</u> • Login to VEX Certification Accounts: • VEX V5, Block,Python Programming, Workcell **Customizing Robots and Parts** • **Tinkercade**/Fusion 360, FreeCad(Python coding) • 3D Modeling, **Electric circuits**, Arduino IDE – C/Python Code Workflow Process:Protyping: 2D Sketch > 3D Modeling > 3D Settings > 3D Printing • Inkscape > **Tinkercad** > Ultimaker Cura > Ultimaker (*print Key fob) *Autodesk Fusion 360/Solidworks: Combine 2d Sketch/3D Modeling • Raspberry Pi – Pico Bluetooth/WiFi, Python Precision Machining • Manual/Traditional - Mill and Drill CNC – ComputerNumeric Control –G/M Code	Academic Standards: AZ_CTE Automation & Robotics Tech-Standards STANDARD 2.0 PERFORM ELECTRICAL AND ELECTRONIC TASKS STANDARD 4.0 ANALYZE PROGRAMMABLE LOGIC CONTROLLER (PLC) SYSTEMS STANDARD 7.0 PERFORM DRAFTING TASKS 7.5 Make dimensional CAD drawings (e.g., 2D and 3D) STANDARD 5.0 DESCRIBE THE OPERATION AND USE OF VARIOUS FORMS OR ELECTRICAL MOTORS 5.2 Explain the operation and use of DC motors in automation controls STANDARD 6.0 PERFORM MECHANICAL SYSTEMS LINKAGES TASKS STANDARD 10.0 APPLY SENSOR SOLUTIONS STANDARD 13.0 DEMONSTRATE SAFE AND PROPER USE OF ELECTRONIC AND OTHER LABORATORY EQUIPMENT, TOOLS, AND MATERIAL
