Name:	Grading Quarter:	Week Beginning:
Robert Lefrandt	1	08/06/2024
School Year: 2024-25	Subject: Automation	on & Robotics/Engineering

Academic Notes: Standards: Objective: Students will begin to define what the Automation & Robotics/Engineering Class is and what are the Arizona Notes: State Standards, skills, and possible credentials/certifications. Automation & Certifications: **Robotics** Robotics (AR) https://www.azed.g Lesson Overview: Solidworks Automation & Robotics/Engineering: Define What it is. ov/cte/ar/ Engineering Look at Arizona State Standards **Autodesk Fusion** Engineering https://www.azed.g Robotic **Tour Lab & Resources** ov/cte/es/ Assemblies Mechtronics Fabrication Laser Engrave/Cutting/3D Printing Engineering: Electronics: Arduino B/W/Raspberry Pi Pico B/W (breadboard) ReEngineering Reverse Engineering Soldering/Desoldering(Reworking) Electronic Circuits (beyond breadboard): Structural Circuits: conductive ink, stickers, engraving, Printed Circuit Boards (PCB), etc. Chassis frame body Mechanical (Motion) Gear: Box, train, parallel (linear) stack (vertical), ratio, torque speed Electrical (Ohm's Monday Parallel/Serial Circuits) Chemical electrochemical Physical Magnetism Batteries Software Block PLC ladder logic, CNC, Python, C++, Sensors Bump/touchDista nce Light Camera Physical Computing ΑI Data Collect DataAnalyze Collaborate with schools, 'Industry ProfessionalCom munity

Tuesday

Notes: Certifications: Robotics (AR) Solidworks Engineering Autodesk Fusion 360 Robotic Assemblies Mechtronics

Engineering: ReEngineering Reverse Engineering

Structural Chassis frame body

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

Electrical (Ohm's Law, Parallel/Serial Circuits) Chemical electrochemical

Physical Magnetism Batteries

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

Sensors Bump/touchDista nce Light Camera

Physical Computing

Al Data Collect DataAnalyze

Collaborate with schools, 'Industry ProfessionalCom munity

## Objective:

Apply basic engineering principles and technical skills for... artificial intelligent management ...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: Workflow Process:

## Level 1 Students:

- Login to VEX Certification Accounts:
- VEX V5 ,Block Programming, Python Programming, Workcell
  - RemoteCotrol and building VEX V5 Robots -Speedbot/Base Bot
  - Coding-Block/Python/C/C++

Sensors: Bump/touch, Distance, Line Tracker, Camera, , AI, Data Analysis

\*\*\*Customizing Robots and Parts: After Completing 1st Semester Skills

Level 2 Plus+ Students:

- Login to VEX Certification Accounts: (Complete Certifications + Arduino/PCEP)
- Tinkercade(Autodesk)/PHET(Physics-Engineering-Tech) Univ-Colorado
- 3D Modeling, Electric circuits, Arduino IDE C/Python Code
- Protyping: 2D Sketch > 3D Modeling > 3D Settings > 3D Printing
- Inkscape > Tinkercad > Ultimaker Cura (Settings) > Ultimaker (Print)

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

• Raspberry Pi – Pico Kit -Bluetooth/WiFi, Python

Precision Machining CAD/CAM:

- 3D Printing
- Manual/Traditional Mill and Drill,
- CNC –ComputerNumeric Control –G/M Code

Academic Standards:

Arizona
Department of
Education
Website:

Program
Description/Indust
ry
Credentials/Coher
ent Sequence/

www.azed.gov/cte/ ar/

https://www.azed.g ov/cte/es/

www.azed.gov/sites /default/files/2021/ 06/ProgramDescript ion\_AutomationAnd Robotics.pdf

Arizona Career and Technical Education Professional Skills have 9 areas of measurement:

www.azed.gov/cte /profskills/

www.azed.gov/site s/default/files/202 2/08/PrintablePrea ssessment.pdf

1. Communication 2. Collaboration / **Teaming Abilities** 3. Thinking and Innovation / **Problem Solving** 4. Professionalism / Formal Behavior 5. Initiative and Self-Direction / Leadership 6. Intergenerational and Cross-Cultural Competence / Acceptance and Inclusion 7. Organizational Culture / Values 8. Legal and Ethical Practices / Safety 9. Financial **Practices** 

Objective: Notes: Academic Apply basic engineering principles and technical skills for... artificial intelligent management ...the principles Standards: of robotics, design, operational testing, system maintenance, repair procedures, robot computer systems, Robotic Arizona and control languages. Assemblies Department of Mechtronics (AZ CTE Automation & Robotics-Program Description) Education Website: Engineering: PERFORM ELECTRICAL AND ELECTRONIC TASKS ReEngineering Program ANALYZE PROGRAMMABLE LOGIC CONTROLLER (PLC) SYSTEMS Reverse Description/Indust PERFORM DRAFTING TASKS-Make dimensional CAD drawings (e.g., 2D and 3D) Engineering DESCRIBE THE OPERATION AND USE OF VARIOUS FORMS OR ELECTRICAL MOTORS Credentials/Coher Structural Explain the operation and use of DC motors in automation controls ent Sequence/ Chassis frame PERFORM MECHANICAL SYSTEMS LINKAGES TASKS body www.azed.gov/cte/ APPLY SENSOR SOLUTIONS ar/ Mechanical DEMONSTRATE SAFE AND PROPER USE OF ELECTRONIC AND OTHER LABORATORY EQUIPMENT. (Motion) TOOLS, AND MATERIALS www.azed.gov/sites Gear: Box, train, /default/files/2021/ Lesson Overview: Workflow Process: parallel (linear) 06/ProgramDescript Level 1 Students: stack (vertical), ion\_AutomationAnd ratio, torque Login to VEX Certification Accounts: Robotics.pdf speed VEX V5 ,Block Programming, Python Programming, Workcell Arizona Career and RemoteCotrol and building VEX V5 Robots -Speedbot/Base Bot **Technical Education** Electrical (Ohm's Coding-Block/Python/C/C++ **Professional Skills** have 9 areas of Law, Sensors: Bump/touch, Distance, Line Tracker, Camera, , AI, Data Analysis Parallel/Serial measurement: \*\*\*Customizing Robots and Parts: After Completing 1st Semester Skills Circuits) www.azed.gov/cte Chemical Level 2 Plus+ Students: /profskills/ electrochemical Login to VEX Certification Accounts: (Complete Certifications + Arduino/PCEP) www.azed.gov/site Wednesday Physical s/default/files/202 Tinkercade(Autodesk)/PHET(Physics-Engineering-Tech) Univ-Colorado 2/08/PrintablePrea Magnetism 3D Modeling, Electric circuits, Arduino IDE – C/Python Code ssessment.pdf **Batteries** Protyping: 2D Sketch > 3D Modeling > 3D Settings > 3D Printing 1. Communication 2. Collaboration / Software Inkscape > Tinkercad > Ultimaker Cura (Settings) > Ultimaker (Print) **Teaming Abilities** Block 3. Thinking and PLC ladder logic, \*Autodesk Fusion 360/Solidworks: Combine 2d Sketch/3D Modeling Innovation / CNC, Python, **Problem Solving** Raspberry Pi – Pico Kit -Bluetooth/WiFi, Python C++, 4. Professionalism / Formal Behavior Precision Machining CAD/CAM: 5. Initiative and Sensors Self-Direction / Bump/touchDista 3D Printing Leadership nce 6. Intergenerational Manual/Traditional - Mill and Drill, Light and Cross-Cultural Camera Competence / CNC -ComputerNumeric Control -G/M Code Acceptance and Inclusion 7. Organizational Physical Culture / Values Computing 8. Legal and Ethical Practices / Safety 9. Financial **Practices Data Collect** DataAnalyze Collaborate with schools, 'Industry ProfessionalCom munity

## Notes: Robotic Assemblies Mechtronics Engineering: ReEngineering Reverse Engineering Structural Chassis frame body Mechanical (Motion) Gear: Box, train, parallel (linear) stack (vertical), ratio, torque speed Electrical (Ohm's Law, Parallel/Serial Circuits) Chemical electrochemical Physical Thursday Magnetism **Batteries** Software Block PLC ladder logic, CNC, Python, C++, Sensors Bump/touchDista nce Light Camera Physical Computing Data Collect DataAnalyze Collaborate with schools, 'Industry ProfessionalCom munity

Academic Standards:

Department of Education

Description/Indust

Credentials/Coher

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**Arizona Career and** 

**Technical Education** 

www.azed.gov/cte

www.azed.gov/site

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2/08/PrintablePrea ssessment.pdf

Communication
 Collaboration /

**Teaming Abilities** 

3. Thinking and

Problem Solving
4. Professionalism /

Formal Behavior

5. Initiative and Self-Direction /

6. Intergenerational

and Cross-Cultural Competence / Acceptance and Inclusion

7. Organizational

Culture / Values 8. Legal and Ethical Practices / Safety 9. Financial

**Practices** 

Leadership

Innovation /

**Professional Skills** 

have 9 areas of

measurement:

/profskills/

Robotics.pdf

ent Sequence/

Arizona

Website:

Program

ar/

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schools, 'Industry

ProfessionalCom

munity

Culture / Values

8. Legal and Ethical

Practices / Safety

9. Financial Practices