**Discovering Automation**
**For Young Engineers**

**Course Syllabus**

**Course Title:** AAI DAYP

**Semester:** Spring 2025

**Instructor:** Director Issac Nash-Bey

**Location:** Akoma Unity Center 1367 N California St., San Bernardino CA 92411

**Contact:**

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**Course Overview**

This 10-week course introduces scholars to industrial automation principles, robotics, and programming fundamentals. Scholars will explore automation's impact on modern industries, gain hands-on experience with robotics programming, and develop problem-solving skills for automation applications. Course Lectures will be every Saturday from 10:00 am to 2:00 pm. Open Lab will be every Friday from 3:00 pm to 7:00 pm. Open Lab is intended for project work and additional self-study. Instructor and/or Intern will be on site.

**Course Schedule**

### Week 1: Foundations of Industrial Automation

📅 **Lecture:** Saturday, April 26, 2025, 🕙 10:00 AM – 2:00 PM

- Program Orientation & Introduction to Automation
- Overview of industrial robots and industrial applications
- Societal Impact and future workforce implications

📅 **Lab:** Friday, May 2, 2025, 🕒 3:00 PM – 7:00 PM

- Open Lab: Independent Research/Worksheet Assignment: Identify and summarize a real-world use of automation.

## Week 2: Robotics Programming Basics

📅 **Lecture:** Saturday, May 3, 2025, 🕙 10:00 AM – 2:00 PM

- Introduction to Robot Programming
- Programming concepts: Logic, loops, and conditionals
- Basic motion control principles
- Writing first simple robot movement scripts

📅 **Lab:** Friday, May 9, 2025, 🕒 3:00 PM – 7:00 PM

- Open Lab: Coding Practice Lab: Create simple robot movement programs; Complete I/O signal simulation exercises

## Week 3: Advancing Robotic Programming (Part I)

📅 **Lecture:** Saturday, May 10, 2025, 🕙 10:00 AM – 2:00 PM

- Motion path planning and trajectory optimization
- Efficient programming for smooth robot operation
- Understanding and programming joint vs Cartesian movement

📅 **Lab:** Friday, May 16, 2025, 🕒 3:00 PM – 7:00 PM

- Open Lab: Motion Planning Lab: Program two new robot trajectories optimizing for speed and efficiency

## Week 4: Advanced Robotic Programming (Part 2)

📅 **Lecture:** Saturday, May 17, 2025, 🕙 10:00 AM – 2:00 PM

- Conditional logic and real-time event handling
- Programming decision-making and branching structures
- Managing external input/output (I/O) for control tasks

🗓️ **Lab:** Friday, May 23, 2025, 🕒 3:00 PM – 7:00 PM

- Open Lab: Decision-Making Program Lab: Develop programs that react to external inputs; Test and debug logical flow

### Week 5: Additive Manufacturing & 3D Printing

🗓️ **Lecture:** Saturday, May 24, 2025, 🕙 10:00 AM – 2:00 PM

- Introduction to 3D printing technologies
- Basics of CAD modeling for automation
- Material types and printing techniques
- Hands-on design and printing of a basic component

🗓️ **Lab:** Friday, May 30, 2025, 🕒 3:00 PM – 7:00 PM

- Open Lab: 3D Design & Print Lab: Create a custom CAD part and print the first prototype

### Week 6: Pneumatics, Grippers, & End Effectors

🗓️ **Lecture:** Saturday, May 31, 2025, 🕙 10:00 AM – 2:00 PM

- Introduction to pneumatic actuation systems
- Overview of grippers and end effector applications
- Hands-on setup and programming of a robotic gripper
- Testing different object handling scenarios

🗓️ **Lab:** Friday, June 6, 2025, 🕒 3:00 PM – 7:00 PM

- Open Lab: Gripper Handling Lab: Program and test gripper movements handling different materials

### Week 7: Application Engineering & Prototype

📅 **Lecture:** Saturday, June 7, 2025, 🕙 10:00 AM – 2:00 PM

- Define real-world automation problems
- Team-based project ideation and planning
- Beginning prototype construction and early testing

📅 **Lab:** Friday, June 13, 2025, 🕒 3:00 PM – 7:00 PM

- Open Lab: Project Planning Lab: Finalize project design drawings and task schedules

### Week 8: Extended Project Development (Part I)

📅 **Lecture:** Saturday, June 14, 2025, 🕙 10:00 AM – 2:00 PM

- Full project construction and system integration
- Interactive testing and debugging
- Refining mechanical and software components

📅 **Lab:** Friday, June 20, 2025, 🕒 3:00 PM – 7:00 PM

- Open Lab: Building & Troubleshooting Lab: Hardware/software integration, initial testing

### Week 9: Extended Project Development (Part 2)

📅 **Lecture:** Saturday, June 21, 2025, 🕙 10:00 AM – 2:00 PM

- Final debugging, system performance testing, and presentation prep

📅 **Lab:** Friday, June 27, 2025, 🕒 3:00 PM – 7:00 PM

- Open Lab: Rehearsal & Final Debugging Lab: Practice full project demonstration with feedback rounds

## Week 10: Capstone Project Showcase & Graduation

📅 **Lecture:** Saturday, June 28, 2025, 🕙 10:00 AM – 2:00 PM

- Final Project Presentations and Live Demonstrations
- Graduation ceremony and awards

### Assessment & Grading

- **Participation & Attendance**
- **Lab Performance**
- **Final Project**

### Course Policies

- Students must follow safety guidelines at all times.
- Attendance in both lectures and labs is mandatory, unless there is an emergency.
- Students must be prepared to learn and participate fully in all activities.
- Treat my instructors, peers, and equipment with respect.
- Demonstrate a positive attitude and willingness to grow.
- Assignments must be completed prior to deadlines to receive full credit.
- Take what I learn and apply I to make a difference in the community.

### Required Materials

- Daily Akoma/Accessible Automation Uniform/Lab Shirt
- Robotic & Automation Lab Binder