

## Appendix 19

The following information represents screen shots from the Robotics and Automation Technology website.

### B.S. Degree Program in Robotics and Automation Technology (120 Credit Hours)

#### Student Performance and Achievement Information

- a. Program Student Graduation Rate: **97%**
- b. Program Student Retention Rate: **97%**
- c. Program Student Mean Grade Point Average of Graduating Class: **3.4**
- d. Average Years to Complete the Degree: **4.5 Years**
- e. Availability of Awards/Scholarships: **(1) ASU Foundation Scholarships (2) ASU Scholarship Universe (3) Federal Financial Aid (4) Department of Advanced Technologies Scholarships (through Entergy Scholarships, Department of Energy Research Grants, Departmental Work/Study Opportunities) (5) other scholarships are available from the ASU Admissions Office.**
- f. Tuition Expenses to Complete Entire Program: **\$ 15,738.24**
- g. Career Placement Rate: **92.857% of graduates are employed within 3 months and one week of graduation (Based on Recent 2024 Graduate Survey).**
- h. Program's Outcome Assessment Process and Results: **(1) Program graduates are surveyed every two years to assess the effectiveness of the Program Learning Outcomes (PLOs) established for the program. The results of the survey are used to improve the under-performing areas of the program. (2) Employers of program graduates are also surveyed about graduates' work performance and the results of the survey are used to improve under-performing PLO areas. (3) Industry Advisory Committee (IAC) inputs are sort and used to improve the Program Learning Outcomes and the overall program.**
- i. Time to Secure First Position: **3.25 Months (3 months and 1 week, Based on 2024 Graduate Survey).**
- j. Average Starting Salaries: **\$42,143 (Based on 2024 Graduate Survey).**
- k. Promotions Earned: **71.428% of graduates surveyed in a recent 2024 graduate survey have earned promotions.**

The Robotics and Automation Technology program prepares students for careers in industrial management, manufacturing technology, quality control, project management, robotics programming, industrial safety, computer integrated manufacturing and other types of technical fields. The program is designed to place graduates into positions as managers of automation technology in industry and government. This program prepares students to be technical generalists so they can move through a lifelong career prepared to change technical occupations if and when needed. After completing the program, the student will be able to manage facilities with modern computerized and robotics systems.

### Accreditation

The Robotics and Automation Technology program is certified by The Association of Technology, Management, and Applied Engineering. (ATMAE). ATMAE's Certified Technology Manager (CTM) examination is required for graduation.

### Robotics & Automation Technology Course Sequence

The sequence of courses for the Robotics and Automation Technology program is shown in the table below.

<b>Freshman Year (30)</b>							
<b>First Semester</b>	<b>Class</b>	<b>Hrs.</b>		<b>Second Semester</b>	<b>Class</b>		<b>Hrs.</b>
TY 101	Problems in Technology	3		EN 112	Composition II		3
EN 111	Composition	3		MA 121	College Algebra		3
HI 111	World Civilization	3		HU 201	Humanities		3
TY 107L	Computer Applications Lab – Word	1		ND 101	Nutrition and Dietetics		1
IT 117L IT 127L	Computer Applications Lab – Spreadsheets or Computer Applications Lab – Presentations	1		EG107/TY17 4	Engineering and Tech Computation & Simulation/ Intro to Computing for Engineers		3
CH 121	Chemistry I	3		UL 101	University Life		1
CH 121L	Chemistry Lab I	1		PE 100 MS 101	Physical Education I or Intro. To the Army		1
	<b>TOTAL</b>	<b>15</b>			<b>TOTAL</b>		<b>15</b>
<b>Sophomore Year (30)</b>							
TY 209	Robotics Applications	3		SA 223	Oral Communication		3
EC 201	Principle of Economics	3		MA 181	Calculus I		4

PY 215	General Physics I (non-calculus)	3		EN 213	Studies in Literature	3
PY 215L	General Physics Lab I (non-calculus)	1		TY 207	CAD/CAM	3
TY 232	Circuit Analysis I	3		TY 201	Prob. In Engineering	3
PE 200 MS 102	Physical Education II or Leadership and Decision Making	1				
	<b>TOTAL</b>	<b>14</b>			<b>TOTAL</b>	<b>16</b>
<b>Junior Year (30)</b>						
TY 301	Techn. And Engin. Analy.	3		TY 322	Occupational Safety Mgt.	3
TY 308	Production, Planning & Control	3		TY 320	Computer Integrated. Manufacturing (CIM)	3
TY 319	Manufacturing Processes	3		TY 339	Plant Layout & Materials Handling	3
CT 326	Computer Programming w/C++	3		TY 394	Lean Manufacturing	3
TY 331	Electronics	3		TY 323	Principles of Technical Mgt.	3
	<b>TOTAL</b>	<b>15</b>			<b>TOTAL</b>	<b>15</b>
<b>Senior Year (30)</b>						
TY 450	Industrial Fluid Power Systems	3		TY 438	Project Management	3
TY 461	PLCs	3		TY 446 / EG 495	Advanced CIM/ Senior Design Project II	3
EG 490	Senior Project Design I	3		TY 487	Robotics Programming	3
_____	Technical Elective	3		TY 456	Machine Control Systems	3
TY 445	Total Quality Management	3		CT 320	Microprocessor I	3
					ATMAE CERTIFICATION EXAM	
	<b>TOTAL</b>	<b>15</b>			<b>TOTAL</b>	<b>15</b>

## **Acceptable Electives for Robotics and Automation Technology**

The Advanced Technologies faculty and its advisory council require students majoring in Robotics and Automation Technology to select electives in computer networking, management, GIS/remote sensing, computer science, energy and power systems. Consider, after consulting your Robotics and Technology advisor, selecting at least 3 semester hours of elective courses from the list as follows:

- Any Computer Networking (CN) or Computer Science class (CS) above the sophomore level is acceptable.
- Engineering and Electro-Mechanical Technology classes are acceptable upon consultation and permission from an assigned student advisor.
- GIS&T classes are acceptable upon consultation and permission from an assigned student advisor.

### **Other acceptable Electives**

MA 336 Mathematical Modeling

MA 346 Linear Algebra

TY 338 Digital Electronics and Micro-processors

TY 361 Feedback Control

TY 405 Industrial Quality Control

TY 467 Electrical Power Distribution Systems

TY 490 Engineering Statistics and Random Signals

TY 499 Environmental Hazards Management

Or any other approved departmental elective with permission.

### Programming Electives

TY 272 Java, CT 326 Programming w/C++, IT 478 C# Programming or programming with approval of AT department head.

\*Students may obtain permission of the chair of the department to substitute required departmental course(s) with other approved course(s) with justification signed by the area advisor.

## Robotics and Automation Course Description

The course descriptions for the various courses in the Robotics and Automation Technology program are presented below.

### **Robotics and Automation**

**TY 101 3-0-3 Problems in Technology:** Basic technological problems and equipment characteristics, velocity, speed, pressure, and temperature calculations and transformations, international and American measurement units, trigonometry in 2D and 3D geometric forms, projections, tolerances, measurement errors, sensitivity of instruments.

**TY 107 1-0-1 Computer Applications Lab:** This course is designed to introduce individuals with little or no computer skills to some of the basic concepts involved in computer application. The course involves a hands-on approach to learning concepts of word processing, electronic spreadsheets database management and graphics. This course will focus on Microsoft Office Suite Application Software (Word, Excel, PowerPoint, Access, and FrontPage). In addition to the above-mentioned Microsoft applications, the course introduces some basic computer concepts and a brief introduction to the Internet.

**TY 174 3-0-3 Engineering and Technology Computation and Simulation:** This course introduces students to technical computation using Matlab and Introductory Computer Language[s]. The focus will be on solving problems in science and technology. It will explore the fundamental principles and logic behind the language.

**TY 201 3-0-3 Problems in Engineering:** Vibrations, coils, nonlinear characteristics and elements, spherical elements and bodies, numeric methods in problems solving, basics of computer dynamic modeling, and simulations.

**TY 207 3-0-3 CAD/CAM:** Basic principles required for pattern drafting, machine drawing, design tolerance and fabrication drawing. This includes emphasis on isometric, oblique, orthographic and simple projections. Computer Aided-Design (CAD) and Computer Aided-Manufacturing (CAM) principles and their practical applications as fundamental elements of the contemporary product realization process. Pre-requisite: MA 121.

**TY 209 3-0-3 Robotics:** Industrial Robots, types and methods of control. Application to various industrial processes including programmable logic controllers, robot programming, kinematics and dynamics, robot system planning and human factors in robot applications. Pre-requisite: MA 121.

**TY 215 3-0-3 Industrial Research Methods:** An introduction to general research methodology which involves industrial research design and statistical data analysis. Emphasis is placed on research problem identification, alternative solutions and solving research problems through proper data collection, analysis, and conclusions.

**TY 232 3-0-3 Circuit Analysis:** Atomic structure of matter; electron, proton, neutron, sources of electricity; battery, Ohm's law, power law, resistance, inductance, capacitance, electro-magnetism, relays transformers, electrical meters, motors, and generators. Extensive oral and written communications are required. Pre-requisite: MA 121.

**TY 246 3-0-3 Machine Control Systems:** An introduction to design and application of machine control systems. Course emphasis is placed on practical aspects and principles of automatic control systems dealing with controllers, calibrators, flow movements, relays, and switching. Extensive oral and written communications are required. Pre-requisite: TY 232.

**TY 301 3-0-3 Technology and Engineering Analysis:** System and process modeling, simulation, technological process design and simulation, applications of mathematics in technology, matrices in solving technological problems, basic statistics, and Monte-Carlo simulations.

**TY 308 3-0-3 Production Planning and Control:** This course deals with theories and concepts that are essential when considering material flow, management problems, decision making techniques and supporting databases in the manufacturing industry. Emphasis is placed on information systems and the use of contemporary manufacturing resources and a material requirement planning software and applications.

**TY 311 3-0-3 Applied Engineering Calculations:** Differential and difference equations in engineering, Fourier and Laplace transform, linear systems, systems of equations, numerical integration and differentiation. Pre-requisite: MA 121.

**TY 319 3-0-3 Manufacturing Processes:** Elements of manufacturing processes. Major emphasis will be placed on materials and processes as they pertain to the concept of inspection and quality control. Extensive oral and written communications are required.

**TY 320 3-0-3 Computer Integrated Manufacturing:** This course is designed to provide students with a comprehensive technical survey of the important topics in Computer Integrated Manufacturing (CIM) Systems. Emphasis is placed on physical integration of both hardware and software in automation and production systems.

**TY 322 3-0-3 Occupational Safety and Management:** This course provides the student with a broad background knowledge of the safety rules and regulations with reference to OSHA, EP, Policies and a variety of scientific studies and investigations on ways and means of controlling diseases, accidents and other industrial hazardous problems in the workplace.

**TY 323 3-0-3 Principles of Technical Management:** This course presents methods of management applied to technical systems aimed at continuous improvement of those systems. Total quality management, human resources management, safety management, project management, and operations and production management are key concepts introduced in the course. The course provides the foundation of technical management approaches. The course

also deals with day-to-day operational problems in contemporary manufacturing industries including Optimized Production Technology (OPT) and other ideas. Special emphasis is placed on detailed treatment of just-in-time (JIT) production scheduling, the scheduling of Flexible Manufacturing Systems (FMS) and complete treatment of distribution requirements for aggregate planning and inventory management.

**TY 331 3-0-3 Electronics:** Electronic theory is discrete devices, and integrated circuits. Applications of semi-conductor devices; diodes, SCR, and transistors. An introduction to transistors, amplifiers, oscillators and active filters. Intro to digital electronics. Extensive oral and written communications are required. Pre-requisite: MA 121 or TY 232.

**TY 338 3-0-3 Digital Electronics and Micro-Processors:** The course will cover number systems, digital signals, logic gates, combinational logic, medium scale IC's sequential logic circuits, and analog converters. Micro-processor memories, PLDs, architectures, intermediate hardware and software, and interface applications. Extensive oral and written communications are required. Pre-requisite: TY 232.

**TY 339 3-0-3 Plant Layout and Material Handling:** The fundamental theories, practices, and methods for the design of manufacturing facilities and analysis of contemporary material handling procedures. Emphasis is placed on plant layout procedures and techniques of material flow for production of goods and services.

**TY 361 3-0-3 Feedback Control:** Modeling and simulation. Single input and single output control, multiple input and multiple output systems. BIBO and asymptotic stability. Control of linear systems, PID controllers, optimal linear control. Pre-requisite: TY 232.

**TY 394 3-0-3 Lean Manufacturing:** This course addresses modern principles and techniques of lean manufacturing. Major topics include lean principles, six sigma, and continuous improvement.

**TY 401 3-0-3 Applications in Technology:** This class summarizes applications in technology covered in the first three semesters of the student's program and introduces students to applications that will be explained in detail in the following semesters.

**TY 405 3-0-3 Industrial Quality Control:** A course that thoroughly examines basic statistical process control concepts and applications. Emphasis is on control charts, including setting scales, charts, interpreting, and analyzing process capability. Problem solving techniques are also emphasized, and all learning is linked to the actual implementation in the workplace. Extensive oral and written communications are required.

**TY 438 3-0-3 Project Management:** Fundamentals of planning, scheduling, and control phases of project activities based on CPM, PERT, and other network-based techniques. Extensive oral and written communications are required.

**TY 445 4-0-4 Total Quality Management:** An application of total quality management principles and management tools used as a framework for productivity and continuous improvement in all

business and industry decisions, including market research, product definition and specification, manufacture, sales and distribution, and service and support.

**TY 446 3-0-3 Senior Capstone:** Individual student computer integrated manufacturing project. This course aimed to show the knowledge of robotics, NC machines, PLCs and industrial networks. A written report and public presentation are required.

**TY 450 3-0-3 Industrial Fluid Power:** A study of basic hydraulics and pneumatics systems, circuits and devices. Emphasis is placed on the design and application of logic controls in hydraulics and pneumatics. Extensive oral and written communications are required.

**TY 456 3-0-3 Machine Control Systems:** An introduction to design and application of machine control systems. Course emphasis is placed on practical aspects and principles of automatic control systems dealing with controllers, calibrators, flow movements, relays, and switching. Extensive oral and written communications are required. Pre-requisite: TY 232.

**TY 461 3-0-3 PLCs:** The course will cover PLC types and architecture. Different input and output hardware. Modular and non-modular PLCs. Ladder logic programming. Treating analog measurements using PLCs. Higher level PLC programming languages. Basics of PLC networking.

**Department of Advanced Technologies and Robotics & Automation Technology Faculty**  
**Members**

David K. Addae, EdD  
John Adjaye, PhD  
Kwabena Agyepong, PhD  
Jermiah K. Billa, PhD  
Randy Derby SR, M.S.  
Sam Nwaneri, PhD  
Erol Sarigul, PhD  
Manoj Bolugalla Padmayya, M.S.

**Adjuncts:**

Jyo Gadewadikar, PhD  
Mamie Griffin, PhD  
Lini Gadewadikar, M. S.  
Shimi Didla, M.S.  
Prashanth Shinde, M.S.  
Maxwell Ankrah, PhD  
Masoud Beitollahi, PhD  
John Jones, M.S.  
Srilatha Mannam, M.S.

Student Advisement

All students in the Department of Advanced Technologies, and hence the Robotics and Automation program must complete the Student Advisement Session Report form in consultation with their academic advisor before or at beginning of every semester to select their courses for the semester. This is done to ensure that students are taking the appropriate courses at the right time to enable them to graduate on time in four years. Sample Student Advisement Session Report form is shown below.

**STUDENT ADVISEMENT SESSION REPORT**

Date: \_\_\_\_\_

Student ID#: \_\_\_\_\_

Classification:  FRESHMAN       SOPHOMORE       JUNIOR       SENIOR

Major: \_\_\_\_\_

Cell Phone #: \_\_\_\_\_ ASU e-mail address: \_\_\_\_\_

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An advisement session was conducted today. During this session, we discussed the following item(s): *(Please check all that applies.)*

- Schedule for Semester (Fall, Spring, Summer 202\_\_)
- Pre-registration (Fall, Spring, Summer 202\_\_)
- Transcript Evaluation                       Midterm Assessment
- Academic Support                               Change my major
- Change my course schedule               Post-Graduation Plans
- Other \_\_\_\_\_



Advisor Print Name: \_\_\_\_\_ Student Print Name: \_\_\_\_\_

\_\_\_\_\_  
Advisor Signature

\_\_\_\_\_  
Student Signature

**Chair – Original**

**Copies: Student/Academic Advisor**

### Student Success

**The Robotics and Automation Technology program is a 4-year program in the Department of Advanced Technologies and requires a total of 120 credit hours for graduation. The mean grade point average (GPA) for undergraduate students at Alcorn State University is 2.93. The mean GPA for the Department of Advanced Technologies is 3.03 and the mean GPA for the Robotics and Automation Technology program is 3.02. These GPAs are based on 0.0 – 4.0 scale and on 12 or more semester hours.**

Average Years to complete the B.S. Robotics and Automation Technology Program = 3.95 Years (~4 Years)

Average Years to secure first Job = 3.25 months (Three Months and One Week)

### Student Organizations

All students in the Robotics and Automation Technology program are required to join the Association of Technology, Management, and Applied Engineering (ATMAE). In addition, after passing ATMAE's Certified Technology Manager (CTM) examination, students become Certified Technology Managers.

### Academic Scholarships

Students entering Alcorn State University as Freshmen can apply for one of the following scholarships based on the student's ACT or SAT scores and high school grade point average (GPA).

<b>Scholarship Name</b>	<b>Scholarship Requirements</b>	<b>Amount</b>
Presidential Excellence	28 ACT or 1310 SAT + Unweighted GPA of 3.50 or higher	\$18,000
Provost	24 ACT or 1180 SAT + Unweighted GPA of 3.25 or higher	\$15,000
University	22 ACT or 1110 SAT + Unweighted GPA of 3.0 or higher	\$10,000
Presidential Diversity Ambassadors	21 ACT or 1080 SAT + Unweighted GPA of 3.0 or higher	\$10,000

Diversity (one time award)	18 ACT or 970 SAT + Unweighted GPA of 3.0 or higher	\$5,000
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There are scholarships available for Community College Transfers and these are as follows:

Scholarship Name	Scholarship Requirements	Amount
MS Community College Transfer  Graduates Scholarship/ Phi Theta Kappa (2-Year Award or 1 <sup>st</sup> Bachelor's Degree)	AA Degree + 3.5 GPA or higher +Phi Theta Kappa Designation	\$10,000
Community College Pathway I Scholarship (2-Year Award or 1 <sup>st</sup> Bachelor's Degree)	AA Degree + 3.25 GPA or higher	\$5,000
Community College Pathway I Scholarship (2-Year Award or 1 <sup>st</sup> Bachelor's Degree)	AA Degree + 3.0 GPA or higher	\$3,000

Information and application forms for these scholarships can be obtained from:

*Alcorn State University  
Office of Admissions  
1000 ASU Drive Box 300  
Lorman, MS 39096  
Phone: 601-877-6148*

[www.alcorn.edu/admissions](http://www.alcorn.edu/admissions) or [admissions@alcorn.edu](mailto:admissions@alcorn.edu)

## Honors Program at Alcorn State University

The Myrlie Evers-Williams Honors Program is Alcorn State University's honors program. Students entering Alcorn State University as Freshmen who wish to participate in the Honors Program must have a 24 or above on the ACT or its equivalent on the SAT. Students who wish to join the program after the first semester of the freshman year are selected based on their cumulative grade point average and the recommendations of two faculty members. A GPA of at least 3.0 is required for second semester freshmen, sophomores, and juniors. Seniors must earn a GPA of at least 3.25 for satisfactory completion of the program. These requirements also apply to Advanced Technologies and hence the Robotics and Automation Technology program students as well. Application forms and other information about the program can be obtained from:

*Myrlie Evers-Williams Honors Program*  
1000 ASU Drive, Box 629, Lorman, MS 39096-7500.  
Phone: 601-877-6139  
[www.alcorn.edu](http://www.alcorn.edu)

## Post Graduate Placement

All Robotics and Automation students eventually get employed upon graduation. A 2024 survey of recent and past graduates spanning a period of 1 to 29 years were all employed within an average period of three months and one week after graduation. Some graduates got job offers before graduation and some got job offers within one week of graduation. The graduates surveyed reported an average starting salary of \$42,143 and average minimum current salary of \$60,000. About 40% of graduates reported income levels of greater than \$75,000. 71.428% of graduates surveyed have received promotions and all promotions included salary increments.

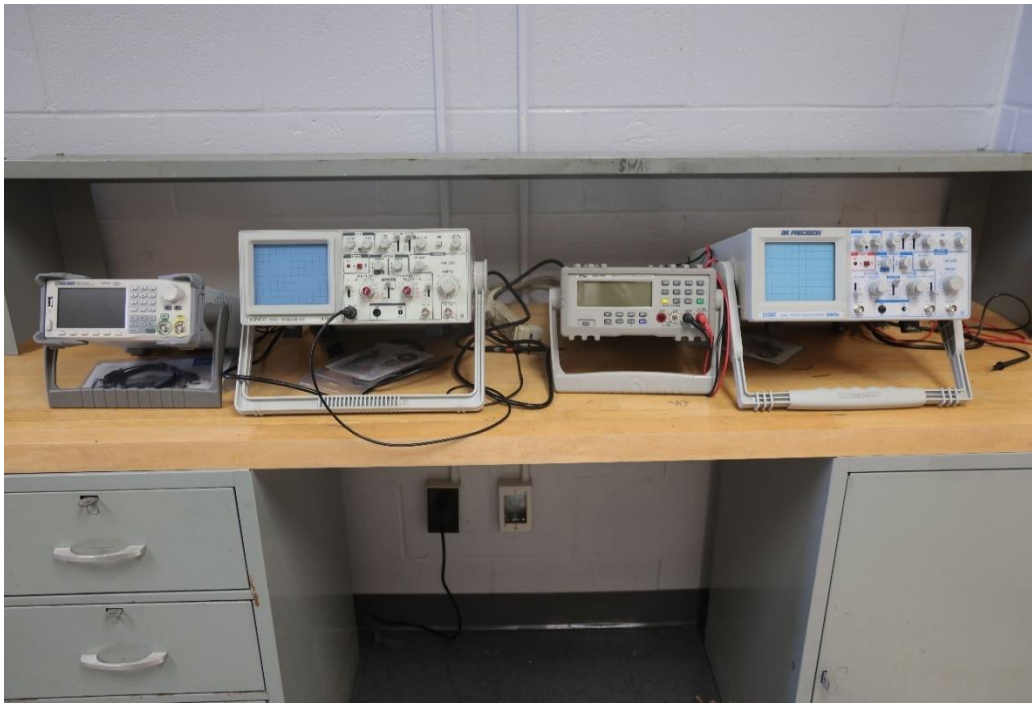
## Facilities and Equipment

The B.S. Robotics and Automation program is one of the five programs offered by the Department of Advanced Technologies located in the Simmon Technology Building on the Alcorn State University's Lorman campus. All the departmental laboratories and classrooms are located in the Simmons Technology Building. The other programs are:

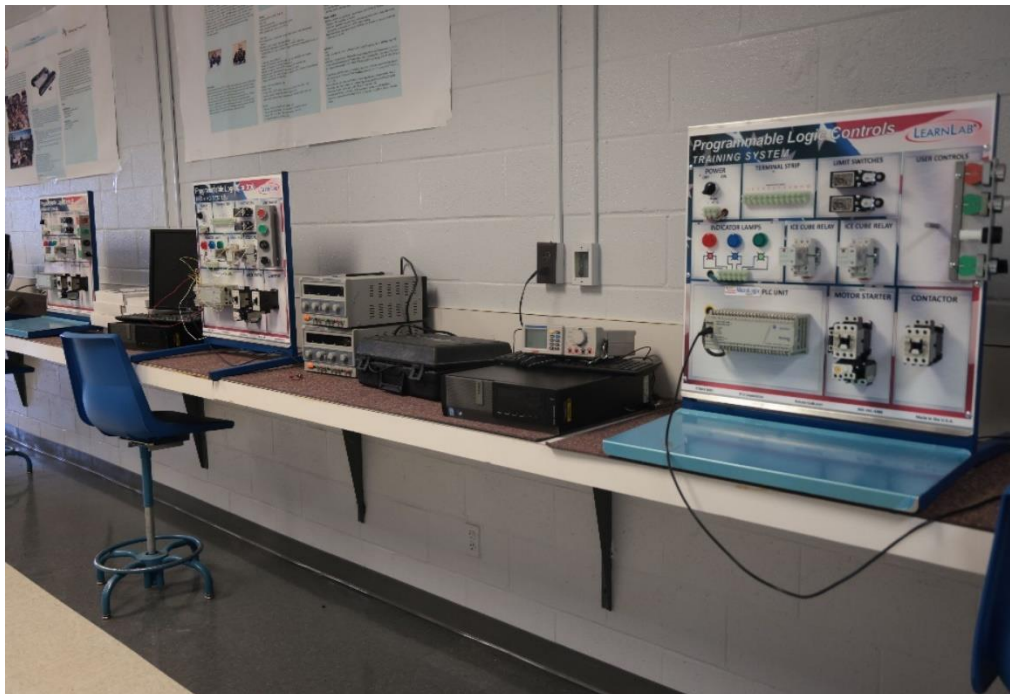
1. B.S. Applied Science and Technology
2. B.S. Computer Networking and Information Technology (CNIT)
3. Pre-Engineering
4. M.S. Workforce Education Leadership (WEL)
5. M.S. Applied Science and Technology

The various types of equipment in the labs include the following:

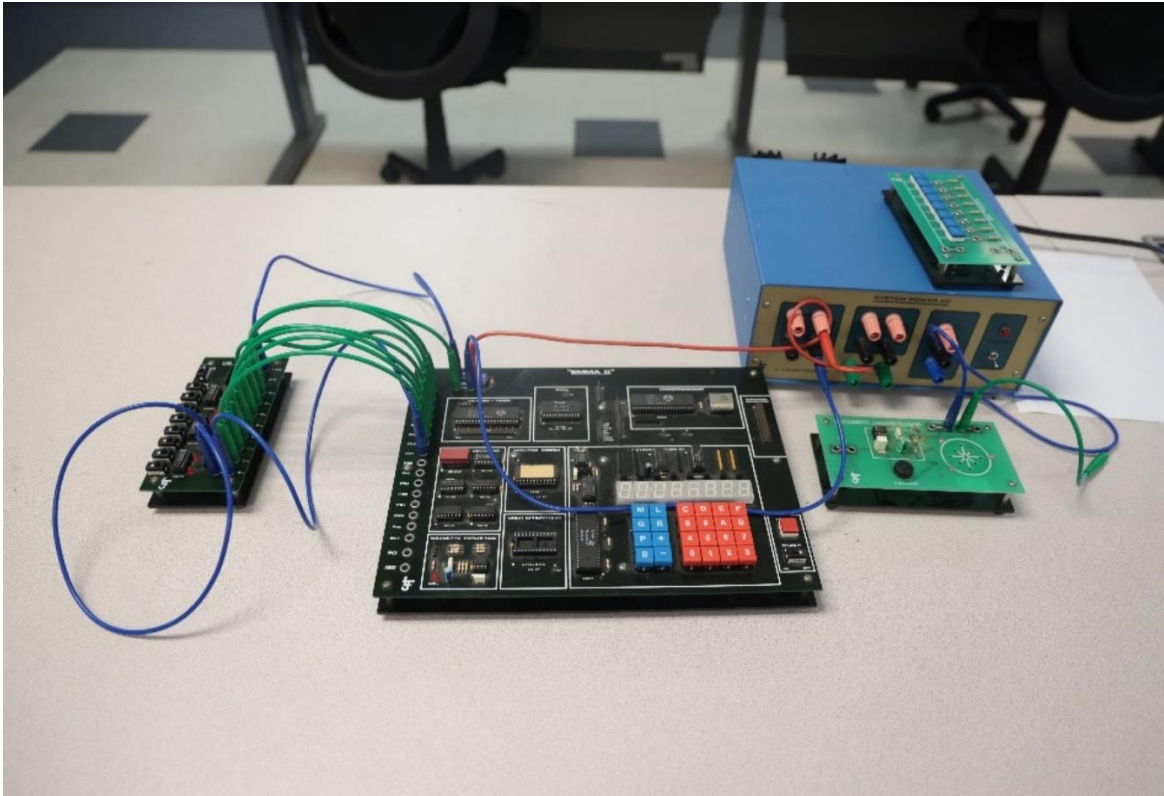
**Signal Generators and Oscilloscopes**-Courses supported: All Technical Courses



**Program Logic Control (PLC) Systems**-Courses Supported: PLC



**Microprocessor and Microcontroller Trainer boards**  
Courses supported: Microprocessors and Microcontrollers

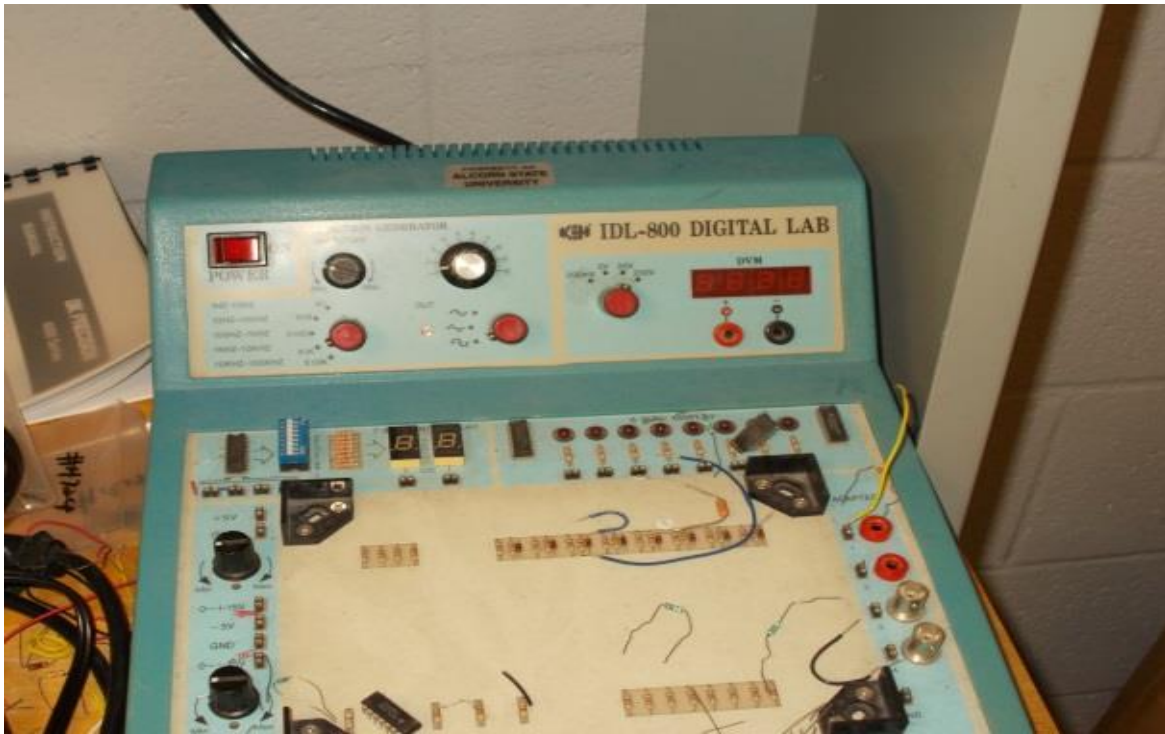


**Robots**

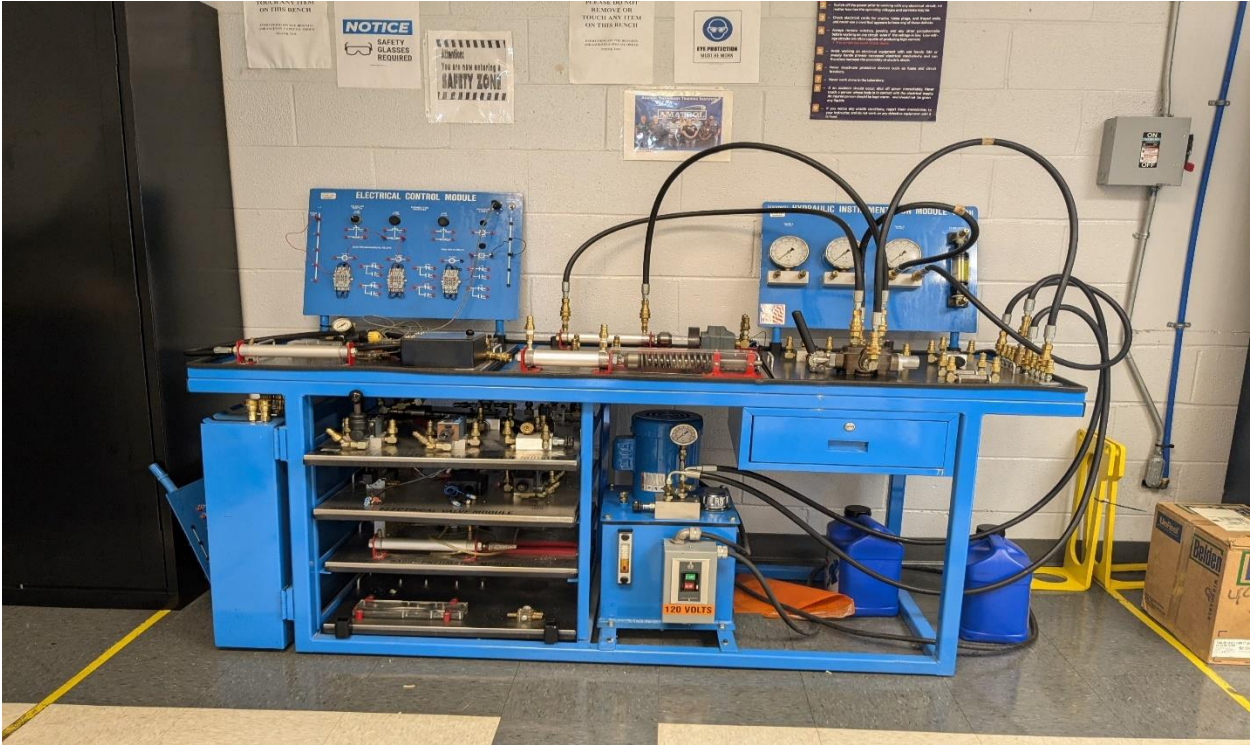
Courses supported: Robotics and Automation Technology program courses



**Digital /Analog Trainers-**  
Courses supported: Digital and Analog Electronics



**Fluid Power Systems-Courses Supported: Industrial Fluid Power Systems**



**3-D Printers for CAD/CAM Application-Courses Supported: CAD/CAM**



# Intelitek Computer Integrated Manufacturing (CIM) System

Courses Supported: Robotics and Automation Courses

