

INDUSTRIAL SYSTEMS TECHNOLOGY

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Electrical and control system technologies are increasingly sophisticated and complex. Electrical/Electronic technologies have changed the fabric of our existence. We are truly living the electronic age. New innovations seem to be routine, daily occurrences. Today's competitive business climate pushes Industry to grasp new technology to maintain tighter control of their processes, knowing better control – better bottom line! Today's industrial electrician is a multi-faceted technician. Modern industrial plants require technician level individuals who, maintain, calibrate, repair, troubleshoot, and wish to grow with new innovation.

Industrial Electrical Technology AAS (100+ credits)

The Industrial Electrical Technology program provides comprehensive two-year curriculum designed to prepare students for career opportunities as industrial electrical technicians. Students receive instruction in safety, electrical and electronic theory, process control, instrumentation, and Programmable Logic Controllers.

Our mission is to prepare students for entry in the world of industrial electricity, with a thorough understanding of electrical safety, and safe practices. We wish to instill the enthusiasm to learn, think, and grow, now and into the future! Favorable opportunities, now and into the foreseeable future, make Industrial Electricity an interesting, outstanding career choice.

Program Learning Outcomes:

IO1 **Communication**

Students will be able to communicate clearly and effectively within a workplace context

IO2 **Quantitative Reasoning**

Students will be able to reason mathematically using methods appropriate to the profession

IO3 **Human Relations/Workplace Skills**

Students will be able to demonstrate teamwork and/or workplace specific skills related to human relations

PO4 Students will be able to apply electronic principals to electro-maintenance activities

PO5 Students will be able to install electrical/electronic apparatus using appropriate techniques

PO6 Students will be able to access controls automation logic equipment for monitoring and troubleshooting purposes

PO7 Students will be able to demonstrate proper mechanical techniques to assembly/disassembly activities

PO8 Students will be able to fabricate simple fixtures as situations generally require

The following schedule of courses is the recommended program for completing this degree. See a program advisor for substitute courses.

First Year

Fall Quarter

IST 100 Intro. to Industrial Safety and Health 3

IST 102 Technical Drawing Interpretation..... 3

IST 105 Basic Electricity: DC Circuit Analysis 5

MAP 103 Applied Mathematics 5

OR MAP 117 Applied Math for Workforce Ed

Winter Quarter	
BUS 120 Human Relations on the Job.....	4
CMST 100 Human Communications.....	4
FAD 150 Industrial First Aid & CPR.....	2
IST 106 Basic Electricity: AC Circuit Analysis	5
IST 120 Intro. to Preventive/Predictive Maintenance	3

Spring Quarter	
ENGL 109 Applied Technical Writing.....	3
IST 107 Industrial Electricity I.....	5
IST 110 Intro. to National Electrical Code	2
IST 113 Ind. Elec. Installation Techniques	5
IST 221 Electronics I (Principles).....	5

Second Year

Fall Quarter	
IST 111 National Electrical Code II.....	2
IST 150 Intro. to Programmable Logic Controls I	5
IST 207 Industrial Electricity II.....	5
IST 222 Electronics II (Applications)	5

Winter Quarter	
IST 112 National Electrical Code III.....	2
IST 152 Programmable Automation Control.....	5
IST 170 Intro. to Instrumentation	5
IST 223 Electronics III (Industrial).....	5

Spring Quarter	
IST 208 Industrial Electricity III.....	5
IST 270 Instrumentation II & Control Actuators	5
IST Approved Electives	2+

Certificate of Achievement

The Certificate of Achievement is designed for students who wish to take specialized courses in a particular field and desire certification acknowledging completion of specific program modules. These modules contain the mathematics, written and oral communications, and human relations related instruction requirements and accepted course requirements for certification.

Electronics Technology Certificate of Achievement (48 credits)

Program Learning Outcomes:

- IO1 **Communication**
Students will be able to communicate clearly and effectively within a workplace context.
- IO2 **Quantitative Reasoning**
Students will be able to reason mathematically using methods appropriate to the profession
- IO3 **Human Relations/Workplace Skills**
Students will be able to demonstrate teamwork and/or workplace specific skills related to human relations.

- PO4 Students will be able to apply electronic principals to electro-maintenance activities
- PO5 Students will be able to install electrical/electronic apparatus using appropriate techniques

The following is a suggested sequence of courses. Interested students must work out courses and schedules with the IST program advisor.

BUS 120 Human Relations on the Job.....	4
CMST 100 Human Communications.....	4
ENGL 109 Applied Technical Writing.....	3
FAD 150 Industrial First Aid & CPR.....	2
IST 105 Basic Electricity: DC Circuit Analysis	5
IST 106 Basic Electricity: AC Circuit Analysis	5
IST 221 Electronics I (Principles).....	5
IST 222 Electronics II (Applications)	5
IST 223 Electronics III (Industrial).....	5
IST Approved Electives	5
MAP 103 Applied Mathematics	5
OR MAP 117 Applied Math for Workforce Ed	

Industrial Electrical Certificate of Achievement (50 credits)

Program Learning Outcomes:

- IO1 **Communication**
Students will be able to communicate clearly and effectively within a workplace context.
- IO2 **Quantitative Reasoning**
Students will be able to reason mathematically using methods appropriate to the profession
- IO3 **Human Relations/Workplace Skills**
Students will be able to demonstrate teamwork and/or workplace specific skills related to human relations.
- PO4 Students will be able to apply electronic principals to electro-maintenance activities
- PO5 Students will be able to install electrical/electronic apparatus using appropriate techniques

The following is a suggested sequence of courses. Interested students must work out courses and schedules with the IST program advisor.

BUS 120 Human Relations on the Job.....	4
CMST 100 Human Communications.....	4
ENGL 109 Applied Technical Writing.....	3
FAD 150 Industrial First Aid & CPR.....	2
IST 105 Basic Electricity: DC Circuit Analysis	5
IST 106 Basic Electricity: AC Circuit Analysis	5
IST 107 Industrial Electricity I.....	5
IST 207 Industrial Electricity II.....	5
IST 208 Industrial Electricity III.....	5
IST 221 Electronics I (Principles).....	5
IST Approved Electives	2+
MAP 103 Applied Mathematics	5
OR MAP 117 Applied Math for Workforce Ed	

Programmable Logic Controllers Certificate of Achievement (48 credits)

Program Learning Outcomes:

- IO1 **Communication**
Students will be able to communicate clearly and effectively within a workplace context.
- IO2 **Quantitative Reasoning**
Students will be able to reason mathematically using methods appropriate to the profession
- IO3 **Human Relations/Workplace Skills**
Students will be able to demonstrate teamwork and/or workplace specific skills related to human relations.
- PO4 Students will be able to apply electronic principals to electro-maintenance activities
- PO5 Students will be able to install electrical/electronic apparatus using appropriate techniques
- PO6 Students will be able to access controls automation logic equipment for monitoring and troubleshooting purposes

The following is a suggested sequence of courses. Interested students must work out courses and schedules with the IST program advisor.

BUS 120 Human Relations on the Job.....	4
CMST 100 Human Communications.....	4
ENGL 109 Applied Technical Writing.....	3
FAD 150 Industrial First Aid & CPR.....	2
IST 105 Basic Electricity: DC Circuit Analysis	5
IST 106 Basic Electricity: AC Circuit Analysis	5
IST 107 Industrial Electricity I.....	5
IST 150 Intro. to Programmable Logic Controls I	5
IST 152 Programmable Automation Control.....	5
IST 207 Industrial Electricity II.....	5
MAP 103 Applied Mathematics	5
OR MAP 117 Applied Math for Workforce Ed	

Boiler/Refrigeration Certificate of Achievement (51 credits)

Program Learning Outcomes:

- IO1 **Communication**
Students will be able to communicate clearly and effectively within a workplace context.
- IO2 **Quantitative Reasoning**
Students will be able to reason mathematically using methods appropriate to the profession
- IO3 **Human Relations/Workplace Skills**
Students will be able to demonstrate teamwork and/or workplace specific skills related to human relations.
- PO5 Students will be able to demonstrate proper mechanical techniques to assembly/disassembly activities

The following is a suggested sequence of courses. Interested students must develop schedules with the program advisor.

BUS 120 Human Relations on the Job.....	4
CMST 100 Human Communications.....	4
ENGL 109 Applied Technical Writing.....	3

FAD 150 Industrial First Aid & CPR	2
IST 105 Basic Electricity: DC Circuit Analysis	5
IST 106 Basic Electricity: AC Circuit Analysis	5
IST 107 Industrial Electricity I	5
IST 120 Intro. to Preventive/Predictive Maintenance	3
IST 130 Intro. to Refrigeration and AC	5
IST 136 Intro. to Industrial Boilers	5
IST 170 Intro. to Instrumentation	5
MAP 103 Applied Mathematics	5
OR MAP 117 Applied Math for Workforce Ed	

Industrial Fabrication Certificate of Achievement (50 credits)

Program Learning Outcomes:

- IO1 **Communication**
Students will be able to communicate clearly and effectively within a workplace context.
- IO2 **Quantitative Reasoning**
Students will be able to reason mathematically using methods appropriate to the profession
- IO3 **Human Relations/Workplace Skills**
Students will be able to demonstrate teamwork and/or workplace specific skills related to human relations.
- PO6 Students will be able to fabricate simple fixtures as situations generally require.

The following is a suggested sequence of courses. Interested students must develop schedules with the program advisor.

BUS 120 Human Relations on the Job	4
CMST 100 Human Communications.....	4
ENGL 109 Applied Technical Writing.....	3
FAD 150 Industrial First Aid & CPR.....	2
IST 102 Technical Drawing Interpretation.....	3
IST 180 Machining I	5
IST 182 Machining II	5
IST 184 Machining Skill Enhancement	4
MAP 103 Applied Mathematics	5
OR MAP 117 Applied Math for Workforce Ed	

WLD 111 Welding Process I	6
WLD 112 Thermal Cutting and Welding.....	3
WLD 122 Gas Metal Arc Welding I	3
WLD 132 Gas Tungsten Arc Welding I (TIG)	3

Maintenance Mechanics Certificate of Achievement (51 credits)

Program Learning Outcomes:

- IO1 **Communication**
Students will be able to communicate clearly and effectively within a workplace context.
- IO2 **Quantitative Reasoning**
Students will be able to reason mathematically using methods appropriate to the profession

IO3 *Human Relations/Workplace Skills*

Students will be able to demonstrate teamwork and/or workplace specific skills related to human relations.

PO5 Students will be able to demonstrate proper mechanical techniques to assembly/disassembly activities

PO6 Students will be able to fabricate simple fixtures as situations generally require.

The following is a suggested sequence of courses. Interested students must develop schedules with the program advisor.

BUS 120 Human Relations on the Job.....	4
CMST 100 Human Communications.....	4
ENGL 109 Applied Technical Writing.....	3
FAD 150 Industrial First Aid & CPR.....	2
IST 120 Intro. to Preventive/Predictive Maintenance	3
IST 180 Machining I	5
IST 130 Intro. to Refrigeration and AC	5
IST 280 Mechanical Power Transmission	5
IST 136 Intro. to Industrial Boilers	5
IST 282 Fluid Power Transmission	5
IST 284 Pump Hydraulics/Mechanics	5
MAP 103 Applied Mathematics	5
OR MAP 117 Applied Math for Workforce Ed	

Certificate of Accomplishment

The Certificate of Accomplishment is designed to provide recognition of completion of certain approved courses or small modules of courses offered through particular technical program. This certification is designed for the occasional and or part-time student that does not plan to complete an Associate in Applied Science degree or Certificate of Achievement.

Big Bend Community College upon request by application, may issue Certificates of Accomplishment upon successful completion of the following approved modules with an earned minimum grade of 2.0 for each course.

Basic Electricity Certificate of Accomplishment (15 credits)

Program Learning Outcomes

IO3 *Human Relations/Workplace Skills*

Students will be able to demonstrate teamwork, ethics, appropriate safety awareness and/or workplace specific skills.

IST 105 Basic Electricity: DC Circuit Analysis	5
IST 106 Basic Electricity: AC Circuit Analysis	5
IST 221 Electronics I (Principles).....	5

Electronics Certificate of Accomplishment (15 credits)

IO3 *Human Relations/Workplace Skills*

Students will be able to demonstrate teamwork, ethics, appropriate safety awareness and/or workplace specific skills.

IST 221 Electronics I (Principles).....	5
IST 222 Electronics II (Applications)	5
IST 223 Electronics III (Industrial).....	5

Industrial Electricity Certificate of Accomplishment (20 credits)

IO3 *Human Relations/Workplace Skills*

Students will be able to demonstrate teamwork, ethics, appropriate safety awareness and/or workplace specific skills.

IST 107 Industrial Electricity I.....	5
IST 113 Ind. Elec. Installation Techniques	5
IST 207 Industrial Electricity II.....	5
IST 208 Industrial Electricity III.....	5

Instrumentation Certificate of Accomplishment (15 credits)

IO3 *Human Relations/Workplace Skills*

Students will be able to demonstrate teamwork, ethics, appropriate safety awareness and/or workplace specific skills.

IST 150 Intro. to Programmable Logic Controls I	5
IST 170 Intro. to Instrumentation	5
IST 270 Instrumentation II & Control Actuators	5

National Electric Code Certificate of Accomplishment (20 credits)

IO3 *Human Relations/Workplace Skills*

Students will be able to demonstrate teamwork, ethics, appropriate safety awareness and/or workplace specific skills.

IST 107 Industrial Electricity I.....	5
IST 113 Ind. Elec. Installation Techniques	5
IST 207 Industrial Electricity II.....	5
IST 208 Industrial Electricity III.....	5

Programmable Logic Controllers Certificate of Accomplishment (15 credits)

IO3 *Human Relations/Workplace Skills*

Students will be able to demonstrate teamwork, ethics, appropriate safety awareness and/or workplace specific skills.

IST 150 Intro. to Programmable Logic Controls I	5
IST 207 Industrial Electricity II.....	5
IST 152 Programmable Automation Control.....	5

Boiler/Refrigeration Certificate of Accomplishment (13 credits)

Program Learning Outcomes:

IO3 *Human Relations/Workplace Skills*

Students will be able to demonstrate teamwork, ethics, appropriate safety awareness and/or workplace specific skills.

IST 120 Intro. to Preventive/Predictive Maintenance	3
IST 130 Intro. to Refrigeration and AC	5
IST 136 Intro. to Industrial Boilers	5

Machining Certificate of Accomplishment (14 credits)

Program Learning Outcomes

IO3 ***Human Relations/Workplace Skills***

Students will be able to demonstrate teamwork, ethics, appropriate safety awareness and/or workplace specific skills

IST 180 Machining I	5
IST 182 Machining II	5
IST 184 Machining Skill Enhancement	4

Mechanical Certificate of Accomplishment (18 credits)

Program Learning Outcomes

IO3 ***Human Relations/Workplace Skills***

Students will be able to demonstrate teamwork, ethics, appropriate safety awareness and/or workplace specific skills

IST 120 Intro. to Preventive/Predictive Maintenance	3
IST 280 Mechanical Power Transmission	5
IST 282 Fluid Power Transmission	5
IST 284 Pump Hydraulics/Mechanics	5

INDUSTRIAL SYSTEMS TECHNOLOGY	Credits	Summer 2019	Fall 2019	Winter 2020	Spring 2020	Summer 2020	Fall 2020	Winter 2021	Spring 2021	Summer 2021
IST 100 Intro. to Industrial Safety and Health	3		X				X			
IST 102 Technical Drawing Interpretation	3		X				X			
IST 105 Basic Electricity: DC Circuit Analysis	5		X				X			
IST 106 Basic Electricity: AC Circuit Analysis	5			X				X		
IST 107 Industrial Electricity I	5		X				X			
IST 110 Intro. to National Electrical Code	2				X				X	
IST 111 National Electrical Code II	2		X				X			
IST 112 National Electrical Code III	2			X				X		
IST 113 Ind. Elec. Installation Techniques	5				X Friday				X Friday	
IST 120 Intro. to Preventive/Predictive Maintenance	3			X				X		
IST 130 Intro. to Refrigeration and AC	5		X				X			
IST 136 Intro. to Industrial Boilers	5			X				X		
IST 150 Intro. to Programmable Logic Controls I	5		X				X			
IST 152 Programmable Automation Control	5			X						
IST 170 Intro. to Instrumentation	5			X						
IST 180 Machining I	5			EVE	EVE			EVE	EVE	
IST 182 Machining II	5			EVE	EVE			EVE	EVE	
IST 184 Machining Skill Enhancement	4			EVE	EVE			EVE	EVE	
IST 207 Industrial Electricity II	5		X				X			
IST 208 Industrial Electricity III	5				X				X	
IST 221 Electronics I (Principles)	5				X				X	
IST 222 Electronics II (Applications)	5		X				X			
IST 223 Electronics III (Industrial)	5			X				X		

IST 270 Instrumentation II & Control Actuators	5				x				x	
IST 280 Mechanical Power Transmission	5		x				x			
IST 282 Fluid Power Transmission	5				x				x	
IST 284 Pump Hydraulics/Mechanics	5				x				x	
MAP 103 Applied Mathematics	5		x				x			