Trenholm State COMMUNITY COLLEGE
The College for Real Careers

Industrial Maintenance Technology (INT)

Program Information

The Industrial Maintenance Technology Program at H. Councill Trenholm State Community College is a multi-craft curriculum. Many crafts are a part of the training process. Craft related instructors teach their respective crafts. HVAC (Heating and Air Conditioning) instructors teach two HVAC classes. The Machine Tool class is taught by the Machine Tool instructor. Basic Electrical and Mechanical classes are taught by the Maintenance Department instructors. As a Multi-Craft Technician in an industrial setting, knowledge and skills in the areas of Basic Electrical, Plant Automation, and Basic Robotic Maintenance and Programmable Logic Controller are required. Limited Machine Tool Technology. Hydraulics and Pneumatics are a major area of related skills included in the curriculum.

Occupational Choices

An industrial maintenance mechanic installs, repairs, replaces, and dismantles the machinery and heavy equipment used in almost every industry. These responsibilities require a wide range of skills, from blueprint reading to diagnosing and solving mechanical problems. Rigging, lifting, and setting up equipment require the skills of an industrial mechanic.

Source: Bureau of Labor and Statistics Occupational Outlook Handbook, 2016-2017 Edition, 2015 Survey.

Average Full-Time Wage

The median annual wage of machinery maintenance workers was $48,410 per year in April 2015. Up from $23.000.00 In 2010. Most mechanics receive benefits including health and life insurance, pension plans, paid vacation, annual leave and sick days.

Source: Bureau of Labor and Statistics Occupational Outlook Handbook, 2016-2017 Edition, 2015 Survey.

Awards Available

Associate in Applied Science Degree
Industrial Maintenance Technology

Short Term Certificate
Industrial Maintenance Technology
Millwright Helper Concentration

Program Contact

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Location: Trenholm Campus - Bldg. Q

As part of ongoing planning and evaluation, the College regularly evaluates student learning outcomes for each program.

Estimated Program Length & Cost *

Award	Length	Credit Hours	Tuition Fees	Books	Tools	Supplies
Associate Degree	6 Terms	75	$10,725	$800	$650	0
Short Term Certificate	2 Terms	27	$3,861	$600	0	0

* Tax not included. Prices are subject to change without prior notice; cost of books may vary considerably among suppliers. The length of the program is based on full-time status of 12-15 credit hours per term. Enrollment in transitional level general education courses will alter the length of the program.

Associate in Applied Science Degree Industrial Maintenance Technology

Required Technical Courses (53 credit hours)

Course	Title	Hrs
ACR-111	Principles of Refrigeration	3
ACR-147	Refrigeration Transition and Recovery	3
INT-101	DC Fundamentals	3
INT-103	AC Fundamentals	3
INT-105	Introduction to Process Technology	3
INT-109	Components of Material Handling	3
INT-110	Automated Material Handling	3
INT-113	Industrial Motor Control I	3
INT-117	Principles of Industrial Mechanics	3
INT-118	Fund of Industrial Pneumatics and Hydraulics	3
INT-119	Principles of Mechanical Measurement & Technical Drawing	3
INT-134	Principles of Industrial Maintenance Welding and Metal Cutting Techniques	3
INT-180	Special Topics	2
INT-184	Introduction to Programmable Logic Controllers	3
INT-215	Troubleshooting Technique	3
INT-288	Applied Principles of Programmable Controllers	3
MTT-100	Machining Technology I	6

Required General Education (22 credit hours)

Course	Title	Hrs
CIS-149	Introduction to Computers OR CIS-146 Microcomputer Apps	3
ENG-101	English Composition I	3
ENG-130	Technical Report Writing OR ENG-102 English Composition II OR SPH-106 Fund of Oral Comm	3
MTH-104	Plane Trigonometry or PHY 120 Intro to Physics	3
MTH-103	Introd to Technical Mathematics	3
MUS-101	Music Appreciation OR ART-100 Art Appreciation	3
ORI-101	Orientation to College	1
PSY-200	General Psychology	3

Total Hours: 75 Credit Hours; 1,808 Contact Hours

Short Term Certificate Industrial Maintenance Technology Millwright Helper Concentration

Required Technical Courses (26 credit hours)

Course	Title	Hrs
ACR-111	Principles of Refrigeration	3
ACR-147	Refrigerant Transition and Recovery Theory	3
INT-101	DC Fundamentals	3
INT-103	AC Fundamentals	3
INT-105	Introduction to Process Technology	3
INT-109	Components of Material Handling	3
INT-117	Principles of Industrial Mechanics	3
INT-118	Fund of Industrial Pneumatics and Hydraulics	3
INT-180	Special Topics	2

Required General Education (1 credit hours)

ORI-101	Orientation to College	1

Total Hours: 27 Credit Hours; 704 Contact Hours

Course Descriptions for Industrial Maintenance Technology (INT)

Course #	Course Title	Theory Contact Hours/Wk	Lab Contact Hours/Wk	Credit Hours

INT-101 DC FUNDAMENTALS 2 3 3

PREREQUISITE: None

This course provides a study of atomic theory, direct current (DC), properties of conductors and insulators, direct current characteristics of series, parallel, and series parallel circuits. Inductors and capacitors are introduced and their effects on DC circuits are examined. Students are prepared to analyze complex DC circuits, solve for unknown circuits variables and to use basic electronic test equipment. This course also provides hands on laboratory exercises to analyze, construct, test, and troubleshoot direct current circuits. Emphasis is placed on the use of scientific calculator and the operation of common test equipment used to analyze and troubleshoot DC and to prove the theories taught during classroom instruction. This is a CORE course. Supports CIP Codes: 15.0303, 47.0105, 46.0302, and 47.0609. This course is also taught as ETC 101, EET 103, ILT 160, ELT 108.

INT-103 AC FUNDAMENTALS 2 3 3

PREREQUISITE: None

This course provides a study of the theory of alternating current (AC). Students are prepared to analyze complex AC circuit configurations with resistor, capacitors, and inductors in series and parallel combinations. Upon completion, students should be able to describe AC circuits and explain the function of A.C. such as RLC, impedance, phase relationships and power factor. This course also provides hands on laboratory exercises to analyze alternating current using a variety of circuit configurations with resistors, capacitors, and inductors in series and parallel combinations. Emphasis is placed on the operation of common test equipment used to analyze and troubleshoot AC circuits to prove the theories taught. This is a CORE course. Supports CIP Codes: 15.0303, 47.0105, 46.0302, and 47.0609. This course is also taught as ETC 102, EET 104, ILT 161, ELT 109.

INT-105 INTRODUCTION TO PROCESS TECHNOLOGY 2 3 3

PREREQUISITE: None

This course is designed to provide students with an introduction to process control technology and various instruments used to control processes. Upon completion, students should be able to comprehend principles of process control technology and the application of various instruments used to control processes in an industrial setting.

INT-109 COMPONENTS OF MATERIAL HANDLING 2 3 3

PREQUISITTES: None

This course focuses on the different modes of handling manufactured goods or products. Topics include the installation, operation, and maintenance of the material handling process components. Emphasis is placed on determining control limits, performing scheduled maintenance, and troubleshooting performance or function failures. Upon completion, students should be able to install, operate, monitor, maintain and troubleshoot a simulated material handling system.

INT-110 AUTOMATED MATERIAL HANDLING 2 3 3

PREREQUISITES: None

This course focuses on the automatic function and control of different modes of handling manufactured goods oro products. Topics include the development of a simulated condition of control parameters with-in the material handling process, determining control limits, and performing root cause analysis. Upon completion, students should be able to write start-up and shut-down procedures, operate, monitor, and control plant material handling systems at the system wide level.

INT-113 INDUSTRIAL MOTOR CONTROL I 1 4 3

PREREQUISITES: None

This course focuses on information regarding industrial motor controls and basic information regarding process logic controllers. Upon completion students will be able to remove, replace, and wire different types of control devices for operating industrial motors.

INT-117 PRINCIPLES OF INDUSTRIAL MECHANICS 2 3 3

PREREQUISITE: None

This course provides instruction in basic physics concepts applicable to mechanics of industrial production equipment. Topics include the basic application of mechanical principles with emphasis on power transmission, specific mechanical components, alignment, and tension. Upon completion, students will be able to perform basic troubleshooting, repair and maintenance functions on industrial production equipment. This is a CORE course.

Course #	Course Title	Theory Contact Hours/Wk	Lab Contact Hours/Wk	Credit Hours

INT-118 FUNDAMENTALS OF INDUSTRIAL HYDRAULICS AND PNEUMATICS **2** **3** **3**

PREREQUISITE: None

This course includes the fundamental concepts and theories for the safe operation of hydraulic and pneumatic systems used with industrial production equipment. Topics include the physical concepts, theories, laws, air flow characteristics, actuators, valves, accumulators, symbols, circuitry, filters, servicing safety, and preventive maintenance and the application of these concepts to perform work. Upon completion, students should be able to service and perform preventive maintenance functions on hydraulic and pneumatic systems. This is a CORE course.

INT-119 PRINCIPLES OF MECH MEASUREMENT & TECHNICAL DRAWING **1** **4** **3**

PREREQUISITE: None

This course provides instruction in the use of precision measuring tools and the interpretation of technical drawings. Topics include the use of calipers, micrometers, steel rules, dial indicators, identifying types of lines and symbols of technical drawings, recognition and interpretation of various types of views, tolerances, and dimensions. Upon course completion, students will be able to use precision measuring tools and interpret technical drawings.

INT-134 PRINCIPLES OF INDUSTRIAL MAINTENANCE WELDING AND METAL CUTTING TECHNIQUES **2** **3** **3**

PREREQUISITE: None

This course provides instruction in the fundamentals of acetylene cutting and the basics of welding needed for the maintenance and repair of industrial production equipment. Topics include oxy-fuel safety, choice of cutting equipment, proper cutting angles, equipment setup, cutting plate and pipe, hand tools, types of metal welding machines, rod and welding joints, and common welding passes and beads. Upon course completion, students will demonstrate the ability to perform metal welding and cutting techniques necessary for repairing and maintaining industrial equipment. This is a CORE course.

INT-180 SPECIAL TOPICS **0** **4** **2**

PREREQUISITE: None

This course is designed to allow students an opportunity to study directly related topics of particular interest which require the application of technical knowledge and technical skills. Emphasis is placed on the application of skills and knowledge with practical experiences. Upon completion, students should be able to solve job-related problems using technical skills and knowledge.

INT-184 INTRO TO PROGRAMMABLE LOGIC CONTROLLERS **2** **3** **3**

PREREQUISITE: None

This course provides an introduction to programmable logic controllers. Emphasis is placed on, but not limited to, the following: PLC hardware and software, numbering systems, installation, and programming. Upon completion, students must demonstrate their ability by developing, loading, debugging, and optimizing PLC programs. This course is also taught as AUT 114, ATM 211, ENT 204, ELT 231, ILT 194, IAT 160, and IET 231.

INT-215 TROUBLESHOOTING TECHNIQUES **1** **4** **3**

PREREQUISITES: None

This course is designed to allow students an opportunity to study directly-related topics of particular interest which require the application of technical knowledge and technical skills. Emphasis is place on the application of skills and knowledge with practical experiences. Upon, completion, students should be able to solve job related problems using technical skills and knowledge.

INT-288 APPLIED PRIN OF PROGRAMMABLE CONTROLLERS **2** **3** **3**

PREREQUISITE: None

This course provides a comprehensive study in the theory and application of specific models of programmable logic controllers. Topics include hardware configuration, memory and addressing detail function of software, instruction types, system troubleshooting, and simple programming techniques.