



Revised Dec 1, 2023

**Advanced Manufacturing Technology (AMT)
Industrial Systems (IST)**

Total Credits: 60

Semester 1- Fall

INMT	1373	Industrial Print Reading	3
INMT	1305	Introduction to Industrial Maintenance	3
ELPT or INMT	1311 or 1372	Basic Electricity Theory or Introduction to Industrial Electricity	3
ACGM	X3XX	Gen Ed Math Elective	3
TSTC	1101	First-Year Seminar	
Semester Total			12

Semester 2 - Spring

ELPT	1341	Motor Controls	3
HYDR	1305	Basic Hydraulics	3
INMT	2303	Pumps, Compressors & Mechanical Drives	3
SPCH	X3XX	Speech Elective	3
Semester Total			12

Semester 3 - Summer

WLDG	1391	Special Topics in Welder/Welding Technologist	3
MCHN	1338	Basic Machine Shop I	3
ELPT	2305	Motors & Transformers	3
ENGL	2311 or 1301	Technical Writing* or Composition I	3
Semester Total			12



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Semester 4 - Fall

RBTC	1301	Programmable Logic Controllers I	3
INMT	2301	Machinery Installation	3
RBTC	1309	Pneumatics	3
ACGM	X3XX	Gen Ed Humanities/Fine Arts Elective	3
Semester Total			12

Semester 5 - Spring

RBTC	1343	Robotics	3
ELPT	2331	AC/DC Drives	3
INMT	2345	Industrial Troubleshooting - Capstone Project	3
ACGM	X3XX	Gen Ed Social/Behavioral Science Elective	3
Semester Total			12

SEMESTER 1

INMT 1373 INDUSTRIAL PRINT READING

2 hours online & 4 hours lab

New course - the description will be added once course development is complete.

ELPT 1311 BASIC ELECTRICAL THEORY

2 hours online & 4 hours lab

Basic theory and practice of electrical circuits. Includes calculations as applied to alternating and direct current.

Course Outcomes

Explain the atomic structure and basic values such as voltage, current, resistance, and power; determine electrical values for combination circuits in direct current (DC) and alternating current (AC) containing resistance, inductance, and capacitance; summarize the principles of magnetism; calculate voltage drop based on conductor length, type of material, and size; and utilize electrical measuring instruments.

Or



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INMT 1372 Introduction to Industrial Electricity

2 hours online & 4 hours lab

An introductory study into industrial electrical circuits. Topics will include electrical power generation, ohm's law for DC and AC circuits, the relationship between Ohm's law and industrial circuits, voltage drop calculation across various loads, basic operations of electrical meters used for testing industrial circuits (to include VOM, Megohm meter, and amp meter), and designing basic industrial circuits.

Course Outcomes

Explain how electricity is generated; identify the components of a complete circuit; identify the difference between a device and a load; calculate resistance, amperage, voltage, and wattage for DC circuits using Ohm's law; calculate resistance, amperage voltage, and wattage for AC circuits using Ohm's Law; selecting and using the proper meter for measuring voltage, and resistance in a circuit; design basic electrical AC circuits; install basic electrical AC circuits.

INMT 1305 INTRODUCTION TO INDUSTRIAL MAINTENANCE

2 hours online & 4 hours lab

Basic mechanical skills and repair techniques common to most fields of industrial maintenance. Topics include precision measuring instruments and general safety rules common in the industry, including lock-out/tag-out.

Course Outcomes

Identify various types of fasteners common to industrial maintenance; utilize various hand and power tools; operation of manual mill and lathe; utilize precision measuring instruments; and demonstrate proper lock-out/tag-out procedures.

ACGM X3XX GEN ED MATH

3 hours online

TSTC 1101 First Year Seminar

2 hours online

Essential elements of student learning success at TSTC.

Course Outcomes

1. Navigate TSTC online applications and other electronic resources
2. Identify and demonstrate the use of academic resources
3. Identify and demonstrate the use of support services
4. Use targeted skills for classroom success
5. Identify effective life skill strategies
6. Demonstrate financial literacy



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SEMESTER 2

ELPT 1341 MOTOR CONTROLS

2 hours online & 4 hours lab

Operating principles of solid-state and conventional controls along with their practical applications. Includes braking, jogging, plugging, safety interlocks, wiring, and schematic diagram interpretations. *Prerequisite AACT 1371 or ELPT 1311 or CETT 1303 or IEIR 1371 OSA may be exempt from requisite. Consult with dept.*

Course Outcomes

Identify practical applications of jogging and plugging; describe the types of motor braking and their operating principles; explain different starting methods for large motors; demonstrate proper troubleshooting methods on circuits using wiring and schematic diagrams.

HYDR 1305 BASIC HYDRAULICS

2 hours online & 4 hours lab

Fundamentals of hydraulics, including types of hydraulic pumps, cylinders, valves, motors, and related systems. Introduction to hydraulic schematic symbols as related to components.

Course Outcomes

Explain characteristics of liquids; define terms related to hydraulics; measure flow rate, pressure, load, speed, and force; identify basic components of a hydraulic system and the schematic symbols; describe characteristics of various system components as applied to equipment hydraulics.

INMT 2303 PUMPS, COMPRESSORS & MECHANICAL DRIVES

2 hours online & 4 hours lab

A study of the theory and operations of various types of pumps and compressors. Topics include mechanical power transmission systems, including gears, v-belts, and chain drives. *Prerequisite INMT 1305*

Course Outcomes

Identify the principles involved in the operation of centrifugal and positive displacement pumps and compressors; explain the function of various components in pumps and compressors, disassemble and reassemble pumps, compressors and mechanical drives, and troubleshoot pumps, compressors, and mechanical drives.

SPCH X3XX SPEECH ELECTIVE

3 hours online



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SEMESTER 3

WLDG 1391 SPECIAL TOPICS IN WELDER/WELDING TECHNOLOGISTS

2 hours online & 4 hours lab

Topics address recently identified current events, skills, knowledge, and/or attitudes and behaviors pertinent to the technology or occupation and relevant to the professional development of the student. This course was designed to be repeated multiple times to improve student proficiency. (SMAW & Oxy/Fuel Cutting)

Course Outcomes

Demonstrate machine set-up and complete welds and cutting operations; demonstrate basic shop safety; identify types of consumables used in welding processes; identify various welding and cutting practices; demonstrate proper joint preparation techniques. Basic welding techniques using the following processes: Oxy-fuel welding (OFW) and cutting, shielded metal arc welding (SMAW), gas metal arc welding (GMAW), and flux cored arc welding (FCAW).

MCHN 1338 BASIC MACHINE SHOP I

2 hours online & 4 hours lab

This course introduces the student to machining fundamentals. The student begins by using basic machine tools, including the lathe, milling machine, drill press, power saw, and bench grinder. Machine terminology, theory, math, part layout, and bench work using common measuring tools are included. Emphasis is placed on shop safety, housekeeping, and preventative maintenance. Prerequisite INMT 1373

Course Outcomes

1. Demonstrate set-up and use of the lathe by applying good housekeeping, proper safety, and preventative maintenance
2. Demonstrate set-up and use of the milling machine by applying good housekeeping, proper safety, and preventative maintenance
3. Demonstrate set-up and use of the drill press, applying good housekeeping, proper safety, and preventative maintenance
4. Demonstrate set-up and use of the power saw, applying good housekeeping, proper safety, and preventative maintenance
5. Demonstrate set-up and use of the bench grinder by applying good housekeeping, proper safety, and preventative maintenance
6. Use precision instruments to perform bench work, including part layout, drilling, reaming, tapping, press fitting, and location of hole centers and surfaces
7. Set up power saws for cutoff operation
8. Demonstrate tooling maintenance
9. Demonstrate hazardous material handling
10. Perform preventative maintenance



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11. Interpret blueprints

ELPT 2305 MOTORS AND TRANSFORMERS

2 hours online & 4 hours lab

Operation of single- and three-phase motors and transformers. Includes transformer banking, power factor correction, and protective devices.

Course Outcomes

1. Match the type of single-phase motor with its principles of operation
2. Compare the operating characteristics of the three types of three-phase motors
3. Explain the advantages of Wye and Delta connections in motor and transit applications
4. Size overcurrent, short circuit, and ground fault protective devices
5. Utilize nameplate information

ENGL 2311 TECHNICAL WRITING or ENGL 1301 COMPOSITION I

3 hours online

SEMESTER 4

ELPT 2319 PROGRAMMABLE LOGIC CONTROLLERS I

2 hours online & 4 hours lab

A study in programmable controllers. Topics Include processor units, numbering systems, memory organization, relay-type devices timers, counters, data manipulators, and programming.

Prerequisite ELPT 1341

Course Outcomes

1. Write a working PLC program using ladder logic
2. Install and troubleshoot the program
3. Integrate PLCs into electro-mechanical systems

INMT 2301 MACHINERY INSTALLATION

2 hours online & 4 hours lab

Students utilize skills acquired in previous studies. Machinery foundations, locations, installation, and alignment activities are practiced and tested. Emphasis is on the various methods of shaft alignment, including laser shaft alignment. *Prerequisite INMT 1305*

Course Outcomes

Perform field layouts for locating machinery; install machinery, which includes leveling and securing; explain the applications of the various types of shaft couplings; align shafts of rotating equipment using various methods



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RBTC 1309 PNEUMATICS

2 hours online & 4 hours lab

A study of principles of pneumatics, including formulas, functions, and circuits with hands-on experience in these industrial automated systems. *Prerequisite HYDR 1305*

Course Outcomes

Describe Pascal's law and its consequences involving pressure; describe the general gas law and its applications; identify the basic pneumatic system components and describe the function of each; calculate pressure, force, or actuator size given any two parameters; and determine compressor size given flow rate, pressure, and actuator requirements.

ACGM X3XX GEN ED HUMANITIES/FINE ARTS ELECTIVE

3 hours online

SEMESTER 5

RBTC 1343 ROBOTICS

2 hours online & 4 hours lab

Principles and applications of robots. Includes installation, interfacing, programming, maintenance, and safety of robots and robotic cells. *Prerequisite CETT 1303 or IEIR 1302 (Prerequisite or Corequisite)*

Course Outcomes

1. Identify and discuss safety, installation, and maintenance concepts
2. Describe the various power sources used in robotics
3. Identify the types of robot interface systems
4. Explain and demonstrate programming methods and control devices
5. Demonstrate the types and uses of end effectors

ELPT 2331 AC/DC DRIVES

2 hours online & 4 hours lab

Installation and maintenance of alternating current (AC) and direct current (DC) variable speed drives with an emphasis on application, operating characteristics, and troubleshooting techniques.

Course Outcomes

Explain technical terms associated with AC and DC drive systems; differentiate between the basic types of control logic and schemes used for AC and DC speed control; compare the advantages and disadvantages of AC versus DC drive systems; program AC and DC drives for specific applications; troubleshoot drives to board level.



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INMT 2345 INDUSTRIAL TROUBLESHOOTING

2 hours online & 4 hours lab

An advanced study of the techniques used in troubleshooting various types of industrial equipment, including mechanical, electrical, hydraulic, and pneumatic systems and their control devices. Emphasis will be placed on the use of schematics and diagrams in conjunction with proper troubleshooting procedures. *Prerequisite ELPT 1341*

Course Outcomes

Demonstrate various troubleshooting techniques; troubleshoot hydraulic, pneumatic, electrical, and mechanical drive systems using schematics and diagrams. An advanced study of the techniques used in troubleshooting various types of industrial equipment, including mechanical, electrical, hydraulic, and pneumatic systems and their control devices. Emphasis will be placed on the use of schematics and diagrams in conjunction with proper troubleshooting procedures.

ACGM X3XX GEN ED SOCIAL/BEHAVIORAL SCIENCE ELECTIVE

3 hours online