

# INDUSTRIAL MAINTENANCE TECHNOLOGY (IMT)

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**IMT 100 (3 credit hours)****Welding for Maintenance**

Provides basic instruction needed for student to weld using SMAW (Stick), GMAW (MIG), GTAW (TIG), and Oxy-Fuel processes. Lecture: 3 credits (45 contact hours).

**Co-requisite:** (IMT 101 or (IMT 1011 - IMT 1014)) or Consent of Instructor.

**Attributes:** Course Also Offered in Modules, Technical

**Components:** LEC: Lecture

**IMT 101 (2 credit hours)****Welding for Maintenance Lab**

Provides application of basic welding skills used in SMAW (Stick), GMAW (MIG), GTAW (TIG) and Oxy-Fuel. Laboratory: 2 credits (60 contact hours).

**Co-requisite:** IMT 100 or consent.

**Attributes:** Course Also Offered in Modules, Technical

**Components:** LAB: Laboratory

**IMT 110 (3 credit hours)****Industrial Maintenance Electrical Principles**

Introduces the theory of electricity and magnetism and the relationship of voltage, current, resistance, and power in electrical circuits. Develops an understanding of alternating and direct current fundamentals. Applies formulas to analyze the operation of AC and DC circuits. Lecture: 3 credits (45 contact hours).

**Co-requisite:** IMT 111 or Consent of Instructor.

**Attributes:** Course Also Offered in Modules, Technical

**Components:** LEC: Lecture

**IMT 111 (2 credit hours)****Industrial Maintenance Electrical Principles Lab**

Verifies knowledge of basic theory by making measurements in working AC and DC circuits. Provides for the construction of various types of circuits and the measurement of their parameters. Stresses the use of test equipment, safety, and troubleshooting. Laboratory: 2 credits (60 contact hours).

**Co-requisite:** IMT 110 or Consent of Instructor.

**Attributes:** Course Also Offered in Modules, Technical

**Components:** LAB: Laboratory

**IMT 115 (2 credit hours)****Maintenance Machining I**

Includes fundamental machining operations necessary for the success of Maintenance Technicians in the field who are required to be proficient in basic machining operations. Lecture: 2 credits (30 contact hours).

**Co-requisite:** IMT 116.

**Attributes:** Course Also Offered in Modules, Technical

**Components:** LEC: Lecture

**IMT 116 (5 credit hours)****Maintenance Machining I Lab**

Includes the application of fundamental machining operations necessary for the success of Maintenance Technicians in the field who are required to be proficient in basic machining operations. Laboratory: 5 credits (150 contact hours).

**Co-requisite:** IMT 115 or Consent.

**Attributes:** Course Also Offered in Modules, Technical

**Components:** LAB: Laboratory

**IMT 120 (3 credit hours)****Industrial Maintenance Rotating Machinery**

Students will learn the basic principles needed for the proper maintenance of AC and DC motors. Lecture: 3 credits (45 contact hours).

**Pre-requisite:** Permission of the instructor.

**Attributes:** Technical

**Components:** LEC: Lecture

**IMT 121 (2 credit hours)****Industrial Maintenance Rotating Machinery Lab**

Provides practical experience in the construction, operation and maintenance of AC motors and alternators and DC motors and generators. Laboratory: 2 credits (60 contact hours).

**Co-requisite:** IMT 120 or Consent of Instructor.

**Attributes:** Technical

**Components:** LAB: Laboratory

**IMT 138 (5 credit hours)****Lean Manufacturing**

Instructs the students in the basic concepts of a safety culture and hazard prediction training. Introduces the fundamental 5S process, the Toyota Production System for Maintenance, the Toyota Problem Solving method, the Toyota Drive and Dedication model, and the Toyota Maintenance Reliability Process and Reliability Centered Maintenance Analysis. Lecture: 5 credits (75 contact hours).

**Attributes:** Course Also Offered in Modules, Technical

**Components:** LEC: Lecture

**IMT 140 (3 credit hours)****Industrial Mechanics**

Introduces the fundamental principles of fluid power, mechanical systems, and the relationship between voltage, current, resistance, and power in electrical circuits. Presents a broad range of technical information used in industry today by technicians, mechanics, and maintenance personnel. Lecture: 3 credits (45 contact hours).

**Co-requisite:** IMT 141.

**Attributes:** Technical

**Components:** LEC: Lecture

**IMT 141 (1 credit hours)****Industrial Mechanics Lab**

Provides laboratory experiences for constructing and adjusting basic fluid power circuits, installing and adjusting mechanical drive components, and taking measurements in operational AC and DC electrical circuits. Stresses the use of common hand tools, test instruments, safety, and troubleshooting. Lab: 1 credit (30 contact hours).

**Co-requisite:** IMT 140.

**Attributes:** Technical

**Components:** LAB: Laboratory

**IMT 150 (3 credit hours)****Maintaining Industrial Equipment I**

Introduces the student to maintenance techniques and procedures used to maintain industrial equipment. Lecture: 3 credits (45 contact hours).

**Co-requisite:** IMT 151 or Consent of Instructor.

**Attributes:** Course Also Offered in Modules, Technical

**Components:** LEC: Lecture

**IMT 151 (2 credit hours)****Maintaining Industrial Equipment I Lab**

Provides the student with lab experience in the maintenance of industrial equipment. Laboratory: 2 credits (60 contact hours).

**Co-requisite:** IMT 150 or Consent of Instructor.

**Attributes:** Course Also Offered in Modules, Technical

**Components:** LAB: Laboratory

**IMT 198 (1-8 credit hours)****Practicum**

Provides supervised on-the-job work experience related to the student's educational objectives. Students participating in the Practicum do not receive compensation. Practicum: 1-8 credits (75-600 contact hours).

**Pre-requisite:** Permission of Instructor.

**Attributes:** Technical

**Components:** PCM: Practicum

**IMT 199 (1-8 credit hours)****Cooperative Education**

Provides supervised on-the-job work experience related to the student's educational objective. Students participating in the Co-op Education program receive compensation for their work. Co-op: 1 - 8 credits (75-600 contact hours).

**Pre-requisite:** Permission of Instructor.

**Attributes:** Technical

**Components:** COP: Co-op

**IMT 200 (4 credit hours)****Industrial Robotics and Robotic Maintenance**

Provides the industrial maintenance student an introduction to the theory of robots including applications, basic programming, components, industrial robotic safety standards, industrial robots classifications, key programming techniques, robotic motion concepts, and terminology. Instructs students on the concepts of preventive and predictive

maintenance techniques required for a robot and their backup systems and recovery procedures. Provides the opportunity for the industrial maintenance student to develop, set up, and integrate work cells into manufacturing systems at a beginning level. Lecture: 2 credits (30 contact hours). Laboratory: 2 credits (60 contact hours).

**Pre-requisite:** IMT 110 and IMT 111 or Consent of Instructor.

**Attributes:** Technical

**Components:** LAB: Laboratory, LEC: Lecture

**IMT 220 (3 credit hours)****Industrial Maintenance Electrical Motor Controls I**

Addresses the common symbols used in motor control circuits, the fundamentals of electrical schematics and wiring diagrams, the principles of relays, motor starters, switches, pilot devices, sensing devices, and indicator lights, and introduces the different types and operations of basic motor control circuits. Lecture: 3 credits (45 contact hours).

**Pre-requisite:** IMT 110, & IMT 111.

**Co-requisite:** IMT 221.

**Attributes:** Course Also Offered in Modules, Technical

**Components:** LEC: Lecture

**IMT 221 (2 credit hours)****Industrial Maintenance Electrical Motor Controls I Lab**

Includes an application of common symbols used in motor control circuits, fundamentals of electrical schematics and wiring diagrams, principles of relays, motor starters, switches, pilot devices, sensing devices, indicator lights, and the different types and operations of basic motor control circuits. Laboratory: 2.0 credits (60 contact hours).

**Pre-requisite:** (IMT 110 and IMT 111) or consent of instructor.

**Co-requisite:** IMT 220.

**Attributes:** Course Also Offered in Modules, Technical

**Components:** LAB: Laboratory

**IMT 222 (2 credit hours)****Industrial Maintenance Motor Controls II**

Provides advanced study of motor controls in industry. Addresses open and closed loop control systems, servo motors, encoders, AC and DC motors and industry standard color coding. Lecture: 2 credits (30 contact hours).

**Pre-requisite:** (IMT 110 and IMT 111 and IMT 220 and IMT 221) or consent of instructor.

**Co-requisite:** IMT 223.

**Attributes:** Course Also Offered in Modules, Technical

**Components:** LEC: Lecture

**IMT 223 (2 credit hours)****Industrial Maintenance Motor Controls II Lab**

Provides advanced study of motor controls in industry. Addresses open and closed loop control systems, servo motors, encoders, AC and DC motors and industry standard color coding. Laboratory: 2 credits (60 hours).

**Pre-requisite:** (IMT 110 and IMT 111 and IMT 220 and IMT 221) or consent of instructor.

**Co-requisite:** IMT 222.

**Attributes:** Course Also Offered in Modules, Technical

**Components:** LAB: Laboratory

**IMT 230 (5 credit hours)****Industrial Maintenance of PLCs**

This course includes the theory of programmable logic controllers to include installation, programming, interfacing, and troubleshooting of industrial PLC's.

**Pre-requisite:** IMT 240

**Attributes:** Technical

**Components:** LEC: Lecture

**IMT 231 (2 credit hours)****Industrial Maintenance of PLC's Lab**

Addresses the diversity of PLC control devices and applications used in industry today. Safety and electrical lockouts are also included.

Laboratory: 2 credits (60 contact hours).

**Pre-requisite:** [(IMT 110 and 111) or IMT 130 and 131] with a grade of C or greater] or Consent of Instructor.

**Co-requisite:** IMT 230 or Consent of Instructor.

**Attributes:** Technical

**Components:** LAB: Laboratory

**IMT 250 (2 credit hours)****Maintaining Industrial Equipment II**

Integrates the student's accumulative knowledge from the IMT 150 and IMT 151 courses. Emphasizes troubleshooting techniques and applied machine repair situations that require the student to apply learned skills from all areas of the curriculum. Lecture: 2.0 credits (30 contact hours).

**Pre-requisite:** (IMT 150 and 151) with a grade of "C" or greater or consent of instructor.

**Co-requisite:** IMT 251 or consent of instructor.

**Attributes:** Technical

**Components:** LEC: Lecture

**IMT 251 (3 credit hours)****Maintaining Industrial Equipment II Lab**

Complements IMT 250 and consists of advanced, specific and assigned machine repair tasks. Laboratory: 3.0 credits (90 contact hours). Lab: 3.0 credits (90 contact hours).

**Pre-requisite:** (IMT 150 and 151) with a grade of "C" or greater or consent of instructor.

**Co-requisite:** IMT 250 or consent of instructor.

**Attributes:** Technical

**Components:** LAB: Laboratory

**IMT 260 (7 credit hours)****Presswork and Die Maintenance**

Includes the fundamental concepts and machining operations needed by the industrial maintenance technician to be proficient in the field of stamping press and die maintenance. Lecture: 2 credits (30 contact hours), Lab: 5 credits (150 contact hours).

**Pre-requisite:** IMT 100 and IMT 101 and [(IMT 115 & IMT 116) or (MTT 114) or (MTT 110 & MTT 112)] or consent of instructor.

**Attributes:** Technical

**Components:** LEC: Lecture

**IMT 280 (3 credit hours)****Advanced Programmable Logic Controllers**

Covers advanced theory programmable logic controllers to include designing applications, programming, interfacing and troubleshooting of industrial PLCs. Lecture: 3 credits (45 contact hours).

**Pre-requisite:** ((IMT 220 and IMT221 with a grade of "C" or greater) or (equivalent) or Consent of Instructor).

**Co-requisite:** IMT 281 or Instructor consent.

**Attributes:** Course Also Offered in Modules, Technical

**Components:** LEC: Lecture

**IMT 281 (2 credit hours)****Advanced Programmable Logic Controllers Lab**

Provides practical applications of the theory in IMT 280 to include installation, programming, interfacing and troubleshooting of industrial PLCs. Laboratory: 2 credits (60 contact hours).

**Pre-requisite:** (IMT 220 and 221) with a grade of C or greater) or Consent of Instructor.

**Co-requisite:** IMT 280 or Consent of Instructor.

**Attributes:** Course Also Offered in Modules, Technical

**Components:** LAB: Laboratory

**IMT 282 (3 credit hours)****PLC Programming Languages**

Covers the use of the four main Programmable Logic Controllers (PLC) programming languages specified in the International Electrotechnical Commission (IEC) 61131-3 international standard: Ladder Diagram, Function Block Diagram, Structured Text, and Sequential Function Chart. Discusses a variety of PLC networking protocols such as Ethernet/IP. Lecture: 2 credits (30 contact hours). Laboratory: 1 credit (30 contact hours).

**Pre-requisite:** IMT 280 or ELT 250 or EET 276 and EET 277 or Consent of Instructor.

**Attributes:** Technical

**Components:** LAB: Laboratory, LEC: Lecture

**IMT 289 (1 credit hours)****Industrial Maintenance Technology Capstone**

Serves as the capstone course for the Industrial Maintenance Technology degree program. Integrates prior learning outcomes into a single integrated learning experience. Includes preparation for an exit exam that all program graduates must take. Lecture: 1 credit (15 contact hours).

**Pre-requisite:** ((BRX 120 or ELT 102) and FPX 100 and FPX 101 and IMT 100 and IMT 101 and IMT 110 and IMT 111 and IMT 150 and 151 and IMT 220 and IMT 221) or consent of instructor.

**Attributes:** Technical

**Components:** LEC: Lecture

**IMT 290 (1-3 credit hours)****Special Problems**

Provides an opportunity to develop advanced skills in topics related to industrial maintenance. Laboratory: 1-3 credits (30-90 contact hours).

**Pre-requisite:** Consent of Instructor.

**Attributes:** Technical

**Components:** LAB: Laboratory

**IMT 1003 (0.75 credit hours)****Welding for Maintenance GMAW (MIG Welding)**

Provides instruction of setup and use of GMAW (MIG welding) equipment. Lecture: 0.75 credit (11.25 contact hours).

**Co-requisite:** IMT 1013 (or consent of instructor).

**Components:** LEC: Lecture

**IMT 1004 (0.75 credit hours)****Welding for Maintenance GTAW (TIG Welding)**

Provides instruction of setup and use of GTAW (TIG welding) equipment. Lecture: 0.75 credit (11.25 contact hours).

**Co-requisite:** IMT 1014 (or consent of instructor).

**Components:** LEC: Lecture

**IMT 1013 (0.5 credit hours)****Welding for Maintenance GMAW (MIG Welding) Lab**

Provides application of setup and use of GMAW (MIG welding) equipment. Laboratory: 0.5 credit (15 contact hours).

**Co-requisite:** IMT 1003 (or consent of instructor).

**Components:** LAB: Laboratory

**IMT 1014 (0.5 credit hours)****Welding for Maintenance GTAW (TIG Welding) Lab**

Provides application of setup and use of GTAW (TIG welding) equipment. Laboratory: 0.5 credit (15 contact hours).

**Co-requisite:** IMT 1004 (or consent of instructor).

**Components:** LAB: Laboratory

**IMT 1381 (1 credit hours)****Safety Culture**

Introduces the importance of cultivating daily safe work habits and the predictable negative results of not being safety conscious in the work place. Instructs the students in basic safety culture and prepares them to participate in, conduct, and lead safety walk-throughs. Introduces the student to Kiken Yoshi Training (KYT) or Hazard Prediction Training. Prepares the student to conduct risk assessment activities, construct safety boards, and formulate individual safety commitments. Lecture: 1 credit (15 contact hours).

**Components:** LEC: Lecture

**IMT 1382 (1 credit hours)****5S**

Introduces the fundamental 5S process involving the five step progression described by the Japanese words Seiri, Seiton, Seiso, Seiketsu, and Shitsuke. Instructs the students in the sequence involving classifying and sorting, ordering and aligning, cleaning and sweeping up, standardizing, and developing a process of sustainable practice in the workplace. Fosters the development of a workplace organization in which safety and efficiency are always paramount. Lecture: 1 credit (15 contact hours).

**Components:** LEC: Lecture

**IMT 1383 (1 credit hours)****Total Production Management**

Instructs the student in the concepts of value-added product, maintenance value-added product, value-added work and necessary work. Explains the process of how Toyota earns profit. Demonstrates the Toyota Production System for Maintenance using the House framework. Describes and explains the three Ms and the seven Mudras and their relationship to maintenance and production. Lecture: 1 credit (15 contact hours).

**Components:** LEC: Lecture

**IMT 1384 (1 credit hours)****Problem Solving**

Introduces the Toyota Business Practice model, the 8 step Toyota Problem Solving method, and the 10 part Toyota Drive and Dedication model. Instructs the students to clarify the problem, break it down to analyze it, set achievable targets, analyze the root cause, develop countermeasures, evaluate results and the process, standardize the results, and learn from failures. Fosters the development of a customer first philosophy involving all the stakeholders. Lecture: 1 credit (15 contact hours).

**Components:** LEC: Lecture

**IMT 1385 (1 credit hours)****Maintenance Reliability**

Introduces the Toyota Maintenance Reliability training. Describes the difference between corrective maintenance and preventive maintenance. Breaks down proactive maintenance and the underlying tools and constituent processes. Instructs the students in the various individual units in a system and the steps in evaluating failure mode risks and countermeasures. Lecture: 1 credit (15 contact hours).

**Components:** LEC: Lecture