Correlation of

Industrial Maintenance and Mechatronics,

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to

NIMS (National Institute for Metalworking Skills)

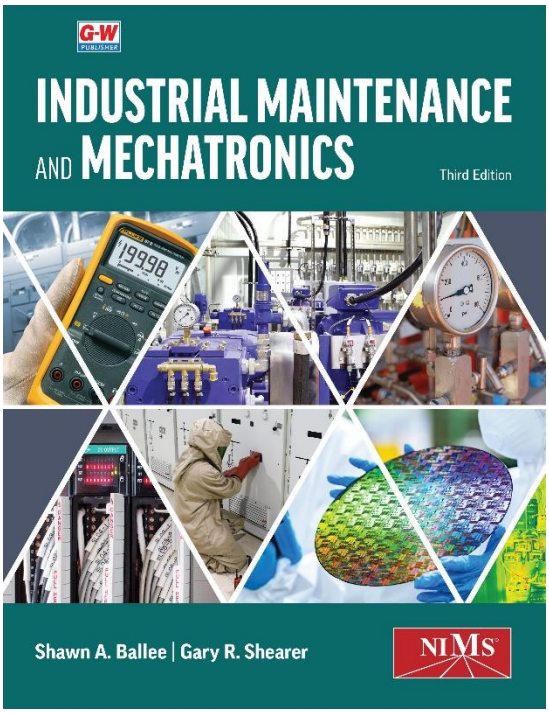
NIMS Smart Standards Knowledge Requirements:

Semiconductor Facility Technician

Industrial Maintenance and Mechatronics carries NIMS' exclusive endorsement and supports attainment of NIMS credentialing in Industrial Technology Maintenance (ITM).

The textbook is designed to work hand-in-glove with the NIMS Smart Standards Knowledge Requirements for Industrial Technology Maintenance. The standards-based learning package will help students pass the testing and performance requirements for NIMS credentialing.

The correlation below lists the NIMS Smart Standard knowledge and performance requirements for a specific ITM Credential. The ITM areas covered in *Industrial Maintenance and Mechatronics* include Maintenance Operations, Mechanical Systems, Hydraulic Systems, Pneumatic Systems, Electrical Systems, Electronic Control Systems, Process Control Systems, Maintenance Piping, and Semiconductor Equipment and Facility Technicians.



Standards	G-W Content
Knowledge Area: Applied Mathematics	
Arithmetic	Textbook: pgs. 892–910
Coordinate Systems	Textbook: pgs. 402, 441–442, 449, 673
Unit of Measurement Conversions	Textbook: pgs. 312, 397, 424, 450–451
Knowledge Area: Chemical Delivery Systems Awareness	
Chemical Types and Properties	Textbook: pgs. 855–858
Chemical Storage and Distribution Infrastructure	Textbook: pg. 858
Safety and Compliance	Textbook: pg. 859

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Standards	G-W Content
Monitoring and Control Systems	Textbook: pgs. 859–860
Maintenance and Troubleshooting	Textbook: pg. 860
Waste Handling and Neutralization	Textbook: pg. 860
Knowledge Area: Clean Room	
Characteristics	Textbook: pgs. 12, 821–826
Product risks	Textbook: pgs. 824–825
Gowning/de-gowning sequence	Textbook: pgs. 825–826
Clean room infrastructure	Textbook: pgs. 821–823, 858
Knowledge Area: Computer Operations	
Organizing and Managing Files	Textbook: pgs. 51–52
Digital File Types (e.g., txt, docx, xlsx)	Textbook: pgs. 51–52
File Naming Conventions	Textbook: pgs. 51–52
Digital Storage Methods (e.g., local, network, cloud)	Textbook: pgs. 50–52
Copy and Paste Functions	Textbook: pgs. 51–52
Knowledge Area: Electrical System Basics	
High voltage systems	Textbook: pgs. 433, 470, 513, 533, 597, 648–649
AC and DC current basics	Textbook: pgs. 319, 382, 448–450, 474–475
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Parallel circuits	Textbook: pgs. 383–384, 420–423, 425
Capacitors	Textbook: pgs. 397, 450, 456–457, 466–469, 514–515, 597, 609–610, 612–613
Resistors	Textbook: pgs. 414–417, 465–466
Transistors and Diodes	Textbook: pgs. 475, 607–609, 621–625
Power Supplies	Textbook: pgs. 404, 607–615, 668
Multimeter use	Textbook: pgs. 134–135, 395–399, 415–417, 471, 595–598, 676
Knowledge Area: Gas Delivery Systems Awareness	
Gas Types and Properties	Textbook: pgs. 869–871
Gas Distribution Infrastructure	Textbook: pgs. 871–872
Safety and Compliance	Textbook: pgs. 872–873
Monitoring and Control Systems	Textbook: pgs. 873–874

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Purge and Vent Systems	Textbook: pgs. 875
Knowledge Area: HVAC Systems Basics	
HVAC Fundamentals	Textbook: pgs. 749–755
Cleanroom Environmental Control	Textbook: pgs. 821–826
Filtration Systems	Textbook: pgs. 749–750
Air Handling Units (AHUs)	Textbook: pgs. 756–761
Humidity and Temperature Control	Textbook: pgs. 750–753, 759–761
Monitoring and Control Systems (BAS and SCADA interfaces)	Textbook: pgs. 685, 855
Safety and Compliance	Textbook: pgs. 757–758, 763–764
Knowledge Area: Hydraulic System Basics	
Hydraulic System Fundamentals	Textbook: pgs. 305–306
Hydraulic Fluids	Textbook: pgs. 306–307, 309
Pumps	Textbook pgs. 305–306, 309–313, 325
Valves and Control Devices	Textbook pgs. 313–320, 322
Actuators	Textbook: pgs. 318–319
Filters	Textbook pgs. 285, 293–297, 335–337, 541, 711, 783
Fittings	Textbook pgs. 286, 297–299, 342
Safety and Compliance	Textbook: pgs. 309, 313, 320, 323
Knowledge Area: Instrumentation and Control System Basics	
Control System Fundamentals	Textbook: pgs. 703–708, 859–860
Sensors and Transducers	Textbook: pgs. 708–714
Actuators and Control Devices	Textbook: pgs. 714–721
Critical Utility Monitoring	Textbook: pgs. 703, 717, 722–723, 873–874
Environmental Monitoring	Textbook: pgs. 851–855
Safety and Compliance	Textbook: pgs. 703, 714, 722
Knowledge Area: Mechanical System Basics	
Force	Textbook: pgs. 173, 175–181
Torque	Textbook: pgs. 173–174, 176
Torque wrench use	Textbook: pgs. 66–67, 94, 525
Hand Tools	Textbook: pgs. 65–77, 220

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Seals	Textbook: pgs. 200–202
Lubrication	Textbook: pgs. 202–205
Knowledge Area: Pneumatic System Basics	
Regulators	Textbook: pgs. 287, 336–337, 344–345
Gauges	Textbook: pgs. 135, 285, 694, 710, 783
Conditioning units	Textbook: pgs. 334–338, 736–743, 788
Conductors	Textbook: pgs. 297–299, 380–381
Valves	Textbook: pgs. 283–288, 306, 313–317, 322–323, 328, 344, 349–350, 360–361, 780
Actuators	Textbook: pgs. 283–284, 286–287, 305–306, 316, 320, 344, 347
Filters	Textbook: pgs. 285, 287, 293–297, 336–337
Fittings	Textbook: pgs. 286, 297–299, 342
Knowledge Area: Quality	
Terminology and definitions	Textbook: pgs. 841–845
Fundamentals of Quality Management Systems	Textbook: pgs. 841–845
Inspection Reports	Textbook: pgs. 820, 845
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Statistical Process Control	Textbook: pgs. 844–845
Standards and Specifications	Textbook: pgs. 841, 844–845
Lean	Textbook: pgs. 841–845
Model-Base Problem Solving (MBPS)	Textbook: pg. 820
Knowledge Area: Safety	
Fire Prevention/Suppression	Textbook: pgs. 23, 26, 38–40
Hazardous Material Information System (HMIS)	Textbook: pg. 25
Arc Flash Safety	Textbook: pgs. 30, 32, 37–38
Chemical Safety	Textbook: pgs. 855–860
Gas Safety	Textbook: pgs. 134, 869–876
Confined Spaces	Textbook: pgs. 34–35
Waste Management	Textbook: pgs. 860, 866–868
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Fork Lift/Material Handling	Textbook pgs. 16, 23, 876–881
Safety Data Sheets (SDS)	Textbook: pgs. 22–25, 160
Machine Guarding	Textbook: pgs. 29, 750
Emergency Stop/Off Systems	Textbook: pgs. 591, 676, 841
Lock Out/Tag Out	Textbook: pgs. 26-29 Lab Workbook: Activity 2-1, Lockout/Tagout Procedure
Knowledge Area: Technical Documents	
Electrical Schematics	Textbook: pgs. 117–118, 490, 547–552, 592–593
Pneumatic Schematics	Textbook: pgs. 342, 344–345, 347, 350–351 Lab Workbook: Activity 18-2, Basic Pneumatic Circuits 1 Lab Workbook: Activity 18-3, Basic Pneumatic Circuits 2
Vacuum Systems Schematics	Textbook: pg. 829
Mechanical System Drawings	Textbook: pgs. 284, 325–327
Plant Schematics (SCADA and BAS)	Textbook: pgs. 686, 855
Maintenance Procedures	Textbook: pgs. 50–52
Computer Maintenance Management Systems	Textbook: pgs. 50–52, 55, 276
Knowledge Area: Vacuum System Basics	
Theory and Definitions	Textbook: pgs. 827–829
Vacuum Safety	Textbook: pg. 827
Vacuum Fittings and Seals	Textbook: pgs. 834–836
Troubleshooting	Textbook: pgs. 826–838
Knowledge Area: Water Systems	
Potable Water	Textbook: pgs. 861–863
Process Cooling Water (PCW)	Textbook: pgs. 863–864
Ultra-Pure Water (UPW)	Textbook: pg. 864
Deionized Water (DI)	Textbook: pgs. 864–866

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Isolating and deenergizing energy sources	Textbook: pgs. 25–29, 40
Determining when to apply COHE	Textbook: pgs. 25, 853, 859, 872–873
Identifying energy sources	Textbook: pgs. 29, 390–394
Verifying equipment: Zero energy state Guarding is functional	 Textbook: pgs. 27 Textbook: pgs. 29, 554
Selecting: Required PPE COHE equipment	 Textbook: pgs. 29–32, 823–824, 859 Textbook: pgs. 27–29, 35–38
Duty Area: Safety—Environmental	
Collecting environmental samples	Textbook: pg. 852
Walking facilities to monitor environments	Textbook: pgs. 852–853
Determining: Where to send sample for analysis When to collect samples When to escalate environmental issues	 Textbook: pgs. 852 Textbook: pgs. 852 Textbook: pgs. 845, 852
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Determining when to escalate issues	Textbook: pg. 845
Duty Area: Quality—Systems Monitoring	
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Making adjustments	Textbook: pgs. 842–845
Determining: When to make adjustments Types of adjustments required	 Textbook: pgs. 831–833, 836–838, 842–845 Textbook: pgs. 831–833, 836–838, 842–845
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Determining when to escalate issues	Textbook: pgs. 47, 845
Duty Area: Maintenance—Electrical	

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Verifying system and component operations	Textbook: pgs. 607–609, 625–626, 643–646, 670–671
Determining when to escalate issues	Textbook: pgs. 47, 845
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Verifying system and component operations	Textbook: pgs. 199, 214, 217, 219, 235, 243, 269, 270–274
Determining when to escalate issues	Textbook: pgs. 47, 845
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Verifying system and component operations	Textbook: pgs. 285–286, 359–365
Determining when to escalate issues	Textbook: pgs. 47, 845
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