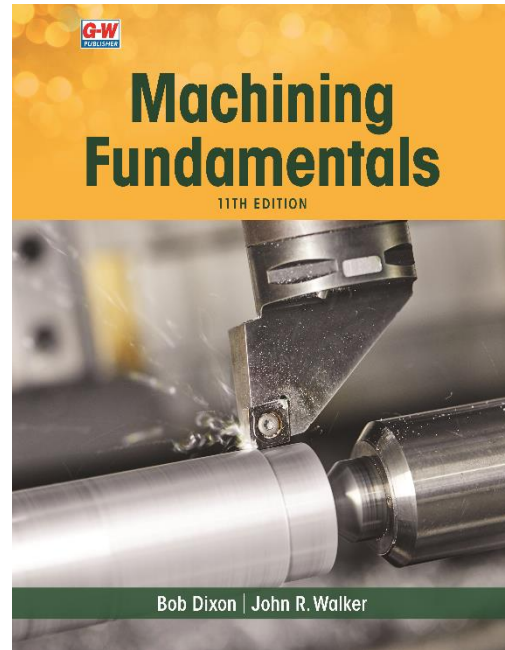




Correlation of
Machining Fundamentals, Dixon and Walker
 (Goodheart-Willcox Publisher ©2023)
 to
NIMS Duties and Standards for Machining Skills Level I

The following chart correlates the NIMS *Duties and Standards for Machining Skills Level I* to the *Machining Fundamentals* textbook. The duty areas and titles are correlated by chapter and page numbers.



Level I Machining Skills

Duty Areas	Textbook Pages
Duty Area 1. Job Planning and Management	
<p>Duty 1.1: Job Process Planning Develop a process plan for a part requiring milling, drilling, turning, or grinding. Fill out an operation sheet detailing the process plan and required speeds and feeds.</p>	<p>Textbook: Chapter 4, pg. 41–56 Certification Practice Print: Clevis, Upper</p>
Duty Area 2. Job Execution	
<p>Duty 2.1: Manual Operations: Benchwork Using aluminum, hand drill and hand tap holes. Use hand drills, hand taps, tap wrench, files, scrapers, and coated abrasives to deburr parts. Use arbor presses to perform press fits. Use bench vises and hand tools appropriately.</p>	<p>Textbook: Chapter 3, pg. 29–40; Chapter 4, pg. 41–56; Chapter 7, pg. 96–98, 108–117, 119–132 Certification Practice Print: 2.1 Benchwork</p>

Duty Areas	Textbook Pages
<p>Duty 2.2: Manual Operations: Layout Lay out the location of hole centers and surfaces within an accuracy of +/-0.015.</p>	<p>Textbook: Chapter 3, pg. 29–40; Chapter 4, pg. 41–56; Chapter 5, pg. 57–83; Chapter 6, pg. 84–95 Certification Practice Print: 2.2 Layout</p>
<p>Duty 2.3: Turning Operations: Between Centers Turning Set up and carry out between centers turning operations for straight turning.</p>	<p>Textbook: Chapter 3, pg. 29–40; Chapter 4, pg. 41–56; Chapter 5, pg. 57–83; Chapter 10, pg. 156–161; Chapter 14, pg. 215–252; Chapter 15, pg. 253–271; Chapter 16, pg. 272–293 Certification Practice Print: 2.3 Turning Between Centers</p>
<p>Duty 2.4: Turning Operations: Chucking Set up and carry out chucking operations for turning.</p>	<p>Textbook: Chapter 3, pg. 29–40; Chapter 4, pg. 41–56; Chapter 5, pg. 57–83; Chapter 10, pg. 156–161; Chapter 14, pg. 215–252; Chapter 15, pg. 253–271; Chapter 16, pg. 272–293 Certification Practice Print: Turning Operations—Chucking</p>
<p>Duty 2.5: Milling: Square Up a Block Set up and perform squaring up the six surfaces of a block to within +/-0.002 and .002 over 4.5" squareness.</p>	<p>Textbook: Chapter 3, pg. 29–40; Chapter 4, pg. 41–56; Chapter 5, pg. 57–83; Chapter 10, pg. 156–161; Chapter 18, pg. 324–342 Certification Practice Print: 2.5 Power Feed Milling</p>
<p>Duty 2.6: Vertical Milling Setup and operate vertical milling machines. Perform routine milling, and location of hole centers within +/-0.005".</p>	<p>Textbook: Chapter 3, pg. 29–40; Chapter 4, pg. 41–56; Chapter 5, pg. 57–83; Chapter 10, pg. 156–161; Chapter 17, pg. 294–322; Chapter 18, pg. 323–354 Certification Practice Print: 2.6 Vertical Milling</p>
<p>Duty 2.7a: Surface Grinding, Grinding Wheel Safety Ring test grinding wheels, perform visual safety inspection, mount and dress a grinding wheel in preparation for surface grinding.</p>	<p>Textbook: Chapter 3, pg. 29–40; Chapter 13, pg. 206–214; Chapter 19, pg. 355–380</p>
<p>Duty 2.7b: Surface Grinding, Horizontal Spindle, Reciprocating Table Set up and operate manual surface grinders with a 8" and smaller diameter wheel. Perform routine surface grinding, location of surfaces, and squaring of surfaces. Perform wheel dressing.</p>	<p>Textbook: Chapter 3, pg. 29–40; Chapter 4, pg. 41–56; Chapter 5, pg. 57–83; Chapter 10, pg. 156–161; Chapter 19, pg. 355–380 Certification Practice Print: 2.7B Surface Grinding</p>

Duty Areas	Textbook Pages
<p>Duty 2.8: Drill Press Set up and operate drill presses. Perform routine drill press operations</p>	<p>Textbook: Chapter 3, pg. 29–40; Chapter 4, pg. 41–56; Chapter 5, pg. 57–83; Chapter 9, pg. 149–155; Chapter 12, pg. 173–205 Certification Practice Print: Semi-finished part for Job 2.8—Drill Press Certification Practice Print: 2.8 Drill Press</p>
<p>Duty 2.9: CNC Programming Using the principles of Cartesian coordinates develop a program for the manufacture of a simple part.</p>	<p>Textbook: Chapter 21, pg. 400–413; Chapter 22, pg. 414–428; Chapter 23, pg. 429–441; Chapter 24, pg. 442–452</p>
<p>Duty Area 3. Quality Control and Inspection</p>	
<p>Duty 3.1: Part Inspection Develop an inspection plan and inspect simple parts using precision tools and techniques. Prepare reports on the compliance of the parts.</p>	<p>Textbook: Chapter 4, pg. 41–56; Chapter 5, pg. 57–83; Chapter 26, pg. 467–482</p>
<p>Duty 3.2: Process Control Follow a sampling plan. Inspect the samples for the required data. Enter the data on appropriate charts. Graph the data. Respond to the warning conditions indicated by the process charts.</p>	<p>Textbook: Chapter 4, pg. 41–56; Chapter 5, pg. 57–83; Chapter 26, pg. 467–482</p>
<p>Duty Area 4. Process Adjustment and Improvement</p>	
<p>Duty 4.1: Process Adjustment—Single Part Production Analyze the performance of a single-part production process. Formulate process adjustments or improvements where appropriate. Where appropriate, notify supervision of the proposed adjustment and/or improvement. Where authorized, carry out the strategies for process adjustment and/or improvement.</p>	<p>Textbook: Chapter 20, pg. 394; Chapter 28, pg. 497–512; Chapter 33, pg. 567–572</p>
<p>Duty 4.2: Participation in Process Improvement As a member of a process team, analyze the performance of a production process. With the team, formulate process adjustments or improvements where appropriate. Where appropriate, notify supervision of the proposed adjustments and/or improvement. Where authorized, carry out the strategies for process adjustment and/or improvement.</p>	<p>Lesson Plans: Chapters 12, 14, 18, 19, and 33</p>
<p>Duty Area 5. General Maintenance</p>	

Duty Areas	Textbook Pages
<p>Duty 5.1: General Housekeeping and Maintenance Keep the duty station clean and safe for work. Keep the tools, workbenches, and manual equipment clean, maintained, and safe for work.</p>	Textbook: Chapter 3, pg. 29–40; Chapter 5, pg. 57–83; Chapter 7, pg. 96–132
<p>Duty 5.2: Preventive Maintenance, Machine Tool Inspect and assess the general condition of an assigned machine tool. Make routine adjustments as necessary and as authorized. Report problems to supervision which are beyond the scope of authority. Carry out daily, weekly, and/or monthly routine upkeep chores cited on checklists for a given machine tool.</p>	Textbook: Chapter 14, pg. 240–241; Chapter 18, pg. 341–342; Chapter 20, pg. 387–388, 394
<p>Duty 5.3: Tooling Maintenance Inspect and assess the condition of tooling. Refurbish tooling where appropriate. Refer tooling for repair or regrind where appropriate.</p>	Textbook: Chapter 12, pg. 193–200; Chapter 13, pg. 206–214; Chapter 14, pg. 230–237; Chapter 17, pg. 301–302; Chapter 19, pg. 367–372
Duty Area 6. Industrial Safety and Environmental Protection	
<p>Duty 6.1: Machine Operations and Material Handling Carry out assigned responsibilities while adhering to safe practices in accordance with OSHA requirements and guidelines. Document safety activities as required.</p>	Textbook: Chapter 3, pg. 29–40; Chapter 11, pg. 170–171; Chapter 12, pg. 177; Chapter 13, pg. 211; Chapter 14, pg. 241–242; Chapter 17, pg. 319–320; Chapter 18, pg. 350–351; Chapter 19, pg. 367; Chapter 20, pg. 393
<p>Duty 6.2: Hazardous Materials Handling and Storage Handle and store hazardous materials as assigned while adhering to safe practices in accordance with OSHA and EPA requirements and guidelines. Document safety activities as required.</p>	Textbook: Chapter 3, pg. 29–40; Chapter 10, pg. 156–161; Chapter 28, pg. 497–512; Chapter 29, pg. 513–531; Chapter 30, pg. 532–545
Duty Area 7. Career Management and Employment Relations	
<p>Duty 7.1: Career Planning Develop and explain a short-term career plan and résumé.</p>	Textbook: Chapter 2, pg. 14–28
<p>Duty 7.2: Job Application and Interviewing Complete job application form and demonstrate interviewing skills.</p>	Textbook: Chapter 2, pg. 22–26; Chapter 6, pg. 94; Chapter 9, pg. 153
<p>Duty 7.3: Teamwork and Interpersonal Relations Demonstrate appropriate interpersonal skills in job performance evaluations, group communication and decision making, and conflict resolution.</p>	Textbook: Chapter 2, pg. 22–26; Chapter 9, pg. 153; Chapter 14, pg. 221; Chapter 16, pg. 281; Chapter 21, pg. 408; Chapter 23, pg. 433

Duty Areas	Textbook Pages
Duty 7.4: Organizational Structures and Work Relations Identify and explain the major departments or functions in a metalworking company and how they affect production units.	Textbook: Chapter 2, pg. 14–28
Duty 7.5: Employment Relations Understand and explain employment rights and responsibilities in metalworking companies.	Textbook: Chapter 2, pg. 22–26; Chapter 3, pg. 29–40