

**CERTIFIED MANUFACTURING TECHNOLOGIST AND  
CERTIFIED MANUFACTURING ENGINEER  
BODY OF KNOWLEDGE**

(RELEASED AUGUST 2010, EFFECTIVE OCTOBER 2010)



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RUBRIC			DESCRIPTION	CMfgT WEIGHTING	CMfgE WEIGHTING
<b>1</b>			<b>MATHEMATICS, APPLIED &amp; ENGINEERING SCIENCES, &amp; MATERIALS</b>	<b>12%</b>	<b>10%</b>
	1.1		Mathematics		
		1.1.1	Algebra		
		1.1.2	Trigonometry		
		1.1.3	Analytical Geometry		
		1.1.4	Calculus (CMfgE ONLY)		
		1.1.5	Statistics		
	1.2		Applied and Engineering Sciences		
		1.2.1	Metrication/SI System		
		1.2.2	Physics		
		1.2.3	Chemistry		
		1.2.4	Statics		
		1.2.5	Dynamics		
		1.2.6	Fluid Mechanics		
		1.2.7	Thermodynamics/Heat Transfer		
		1.2.8	Electrical Circuits/Electronics		
	1.3		Materials Application		
		1.3.1	Metals (Properties and Applications)		
		1.3.2	Plastics/Polymers (Properties and Applications)		
		1.3.3	Composites (Properties and Applications)		
		1.3.4	Ceramics (Properties and Applications)		
		1.3.5	Fluids (Properties and Applications)		
<b>2</b>			<b>PRODUCT/PROCESS DESIGN &amp; DEVELOPMENT</b>	<b>12%</b>	<b>10%</b>
	2.1		Product Design and Development		
		2.1.1	Product R&D		
		2.1.2	Market/Sales/Life Cycle Analysis		
		2.1.3	Intellectual Property Protection (e.g. patents, trademarks, copyrights, etc.)		
		2.1.4	Design Management		
		2.1.5	Simulation/Engineering Design Analysis		
		2.1.6	Concurrent Engineering		
		2.1.7	Design for X (Mfg/Assy/Maint/etc.)		
		2.1.8	Drafting/Drawing/Engineering Graphics/Modeling		
		2.1.9	CAD/CAM/CAE Applications		
		2.1.10	Tolerance Analysis/GD & T		
		2.1.11	Product Liability		
	2.2		Process Design & Development		
		2.2.1	Process R&D		
		2.2.2	Simulation/Process Analysis		
		2.2.3	Product Prototype Build and Test		
		2.2.4	Process Development and Test		
		2.2.5	Print Reading		
		2.2.6	Rapid Prototyping		
<b>3</b>			<b>MANUFACTURING PROCESS APPLICATIONS &amp; OPERATION</b>	<b>14%</b>	<b>15%</b>
	3.1		Manufacturing Process Applications and Operation		
		3.1.1	Material Removal Processes		
		3.1.2	Fabrication Processes		
		3.1.3	Hot and Cold Forming Processes		
		3.1.4	Casting and Molding Processes		
		3.1.5	Electrical/Electronics Mfg. Processes		
		3.1.6	Heat Treatment Processes		

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		3.1.7	Joining, Welding, and Assembly Processes		
		3.1.8	Finishing Processes		
		3.1.9	Bulk and Continuous Flow Processes		
		3.1.10	Material Handling/Packaging		
		3.1.11	Hand Tool Use/Machine Operating		
<b>4</b>			<b>PRODUCTION SYSTEM AND EQUIPMENT DESIGN/DEVELOPMENT</b>	<b>21%</b>	<b>20%</b>
	4.1		Production System Design and Development		
		4.1.1	Infrastructure/Plant Location Analysis		
		4.1.2	Facility Planning/Plant Layout		
		4.1.3	Process Planning & Development		
		4.1.4	Capacity Planning		
		4.1.5	Production/Manufacturing System Design & Organization		
		4.1.6	Process Documentation/Work Instructions		
		4.1.7	Tool and Equipment Selection		
		4.1.8	Production System Build/Test		
		4.1.9	Human Factors, Ergonomics, and Safety		
		4.1.10	Maintenance Systems		
		4.1.11	Environmental Protection/Waste Management		
	4.2		Equipment/Tool Design and Development		
		4.2.1	Cutting Tool Design		
		4.2.2	Work holding Tool Design		
		4.2.3	Die/Mold Design		
		4.2.4	Gage Design		
		4.2.5	Machine Design		
		4.2.6	Power Systems (Mech/Elec/Fluid)		
		4.2.7	Control Systems (Mech/Elec/Fluid)		
		4.2.8	Nanotechnology, Packaging & Systems		
<b>5</b>			<b>AUTOMATED SYSTEMS AND CONTROL</b>	<b>9%</b>	<b>7%</b>
	5.1		Automated Systems and Control		
		5.1.1	Automated Systems (Hard/Flexible)		
		5.1.2	CNC/PLC/Computer Control		
		5.1.3	Computer Systems and Networks		
		5.1.4	Information Technology/Database Systems (MIS, etc.)		
		5.1.5	Enterprise-wide Systems Integration (MES, ERP, etc.)		
<b>6</b>			<b>QUALITY &amp; CONTINUOUS IMPROVEMENT</b>	<b>10%</b>	<b>13%</b>
	6.1		Quality and Customer Service		
		6.1.1	Customer Focus (Research/Test/Satisfaction)		
		6.1.2	Quality System and Standards (e.g. QS/ISO/CE/Mark/etc.)		
		6.1.3	Probability and Statistics		
		6.1.4	Statistical Control Methods (Sampling/Charting/etc.)		
		6.1.5	Problem Analysis & Solving (Fishbone/Pareto/FMEA/etc.)		
		6.1.6	Factor Analysis (DOE/Correlation/etc.)		
		6.1.7	Capability Analysis (Process/Equipment/etc.)		
		6.1.8	Inspection/Test/Validation		
		6.1.9	Metrology		
		6.1.10	Reliability Analysis		
		6.1.11	Continuous Improvement/Lean		
		6.1.12	Customer and Field Service		
<b>7</b>			<b>MANUFACTURING MANAGEMENT</b>	<b>14%</b>	<b>15%</b>
	7.1		Manufacturing Management		
		7.1.1	Strategic Planning/Global Competitiveness		

RUBRIC			DESCRIPTION	CMfgT WEIGHTING	CMfgE WEIGHTING
		7.1.2	Organizational Design and Management		
		7.1.3	Project Management		
		7.1.4	Personnel Management Methods		
		7.1.5	Human Behavior/Motivation/Leadership		
		7.1.6	Labor Relations		
		7.1.7	Education/Training		
		7.1.8	Operations Research, Analysis, & Forecasting		
		7.1.9	Supply Chain & Logistics		
		7.1.10	Accounting/Finance/Economics (including Engineering Economics/Cost Justification/Value Analysis/Project Justification)		
		7.1.11	Business/Engineering Ethics and Social Responsibility		
		7.1.12	Standards, Laws, and Regulations		
<b>8</b>			<b>PERSONAL EFFECTIVENESS</b>	<b>8%</b>	<b>10%</b>
	8.1		Personal Effectiveness		
		8.1.1	Interpersonal Skills		
		8.1.2	Negotiating & Conflict Management		
		8.1.3	Presentation Skills & Oral Communication		
		8.1.4	Written Communication Skills		
		8.1.5	Innovation & Creativity		
		8.1.6	Learning & Knowledge		