



CORPORATE | EDUCATORS | INDIVIDUALS

CERTIFICATION

Certified Manufacturing Technologist (CMfgT)
and Certified Manufacturing Engineer (CMfgE)

Body of Knowledge



RUBRIC		DESCRIPTION	CMfgT WEIGHTING	CMfgE WEIGHTING
1		MATHEMATICS, APPLIED AND ENGINEERING SCIENCES, AND MATERIALS	12%	10%
	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)		
2		PRODUCT/PROCESS DESIGN AND DEVELOPMENT	12%	10%
	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 (Manufacturing, Assembly, Maintenance, 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 and Development		
	2.2.1	Process R&D		

RUBRIC		DESCRIPTION	CMfgT WEIGHTING	CMfgE WEIGHTING
	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		
3		MANUFACTURING PROCESS APPLICATIONS AND OPERATION	14%	15%
	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 Manufacturing Processes		
	3.1.6	Heat Treatment Processes		
	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		
4		PRODUCTION SYSTEM AND EQUIPMENT DESIGN/DEVELOPMENT	21%	20%
	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 and Development		
	4.1.4	Capacity Planning		
	4.1.5	Production/Manufacturing System Design and 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	Workholding 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)		

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	4.2.7	Control Systems (Mech/Elec/Fluid)		
	4.2.8	Nanotechnology, Packaging, and Systems		
5		AUTOMATED SYSTEMS AND CONTROL	9%	7%
	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.)		
6		QUALITY AND CONTINUOUS IMPROVEMENT	10%	13%
	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 and 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		
7		MANUFACTURING MANAGEMENT	14%	15%
	7.1	Manufacturing Management		
	7.1.1	Strategic Planning/Global Competitiveness		
	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, and Forecasting		
	7.1.9	Supply Chain and 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		

RUBRIC		DESCRIPTION	CMfgT WEIGHTING	CMfgE WEIGHTING
8		PERSONAL EFFECTIVENESS	8%	10%
	8.1	Personal Effectiveness		
		8.1.1 Interpersonal Skills		
		8.1.2 Negotiating and Conflict Management		
		8.1.3 Presentation Skills and Oral Communication		
		8.1.4 Written Communication Skills		
		8.1.5 Innovation and Creativity		
		8.1.6 Learning and Knowledge		