

Rubric	Rubric	Rubric	Description	Course Version	Course Title	Course Department
1.0 Mathematics, Applied and Engineering Sciences, and Materials	1.1 Mathematics	1.1.1	Algebra	2.0 Version	Algebra Fundamentals 141	Applied Mathematics
		1.1.2	Trigonometry	2.0 Version	Trigonometry: The Pythagorean Theorem 201	Applied Mathematics
		1.1.2	Trigonometry	2.0 Version	Trigonometry: Sine, Cosine, Tangent 211	Applied Mathematics
		1.1.3	Analytical Geometry	2.0 Version	Geometry: Lines and Angles 151	Applied Mathematics
		1.1.3	Analytical Geometry	2.0 Version	Geometry: Triangles 161	Applied Mathematics
1.0 Mathematics, Applied and Engineering Sciences, and Materials	1.2 Applied and Engineering Sciences	1.1.3	Analytical Geometry	2.0 Version	Geometry: Circles and Polygons 171	Applied Mathematics
		1.1.4	Calculus (CMfgE ONLY)	N/A	N/A	N/A
		1.1.5	Statistics	2.0 Version	Statistics 231	Applied Mathematics
		1.2.1	Metrication/SI System	2.0 Version	Units of Measurement 112	Applied Mathematics
		1.2.2	Physics	1.0 Version	Applied and Engineering Sciences 110	Applied Mathematics
		1.2.3	Chemistry	1.0 Version	Applied and Engineering Sciences 110	Applied Mathematics
		1.2.4	Statics	2.0 Version	Forces of Machines 121	Mechanical Systems
		1.2.5	Dynamics	1.0 Version	Applied and Engineering Sciences 110	Applied Mathematics
		1.2.6	Fluid Mechanics	2.0 Course	The Forces of Fluid Power 201	Fluid Systems
		1.2.7	Thermodynamics/Heat Transfer	1.0 Version	Applied and Engineering Sciences 110	Applied Mathematics
		1.2.8	Electrical Circuits/Electronics	2.0 Version	Electrical Units 101	Electrical Systems
1.0 Mathematics, Applied and Engineering Sciences, and Materials	1.3 Materials Application	1.2.8	Electrical Circuits/Electronics	2.0 Version	Introduction to Circuits 201	Electrical Systems
		1.2.8	Electrical Circuits/Electronics	2.0 Version	Series Circuit Calculations 301	Electrical Systems
		1.2.8	Electrical Circuits/Electronics	2.0 Version	Parallel Circuit Calculations 311	Electrical Systems
		1.2.8	Electrical Circuits/Electronics	2.0 Version	AC Fundamentals 241	Electrical Systems
		1.3.1	Metals (Properties and Applications)	2.0 Version	Introduction to Physical Properties 101	Materials
		1.3.1	Metals (Properties and Applications)	2.0 Version	Introduction to Metals 121	Materials
		1.3.1	Metals (Properties and Applications)	2.0 Version	Introduction to Mechanical Properties 111	Materials
		1.3.1	Metals (Properties and Applications)	2.0 Version	Introduction to Physical Properties 101	Materials
		1.3.1	Metals (Properties and Applications)	2.0 Version	Classification of Steel 201	Materials
		1.3.1	Metals (Properties and Applications)	2.0 Version	Ferrous Metals 231	Materials
		1.3.1	Metals (Properties and Applications)	2.0 Version	Nonferrous Metals 241	Materials
		1.3.1	Metals (Properties and Applications)	2.0 Version	Hardness Testing 221	Materials
		1.3.1	Metals (Properties and Applications)	2.0 Version	Essentials of Heat Treatment of Steel 211	Materials
		1.3.2	Plastics/Polymers (Properties and Applications)	2.0 Version	Introduction to Plastics 131	Materials
		1.3.2	Plastics/Polymers (Properties and Applications)	2.0 Version	Thermoplastics 251	Materials
		1.3.2	Plastics/Polymers (Properties and Applications)	2.0 Version	Thermosets 261	Materials
		2.0 Product/Process Design & Development	2.1 Product Design and Development	1.3.3	Composites (Properties and Applications)	2.0 Version
1.3.4	Ceramics (Properties and Applications)			2.0 Version	Introduction to Ceramics 141	Materials
1.3.5	Fluids (Properties and Applications)			2.0 Version	The Forces of Fluid Power 201	Fluid Systems
2.1.1	Product R&D			1.0 Version	Product Design and Development 134	Quality
2.1.2	Market/Sales/Life Cycle Analysis			1.0 Version	Product Design and Development 134	Quality
2.1.3	Intellectual Property Protection (e.g. patents, trademarks, copyrights, etc.)			1.0 Version	Product Design and Development 134	Quality
2.1.4	Design Management			1.0 Version	Product Design and Development 134	Quality
2.1.5	Simulation/Engineering Design Analysis			1.0 Version	Product Design and Development 134	Quality
2.1.6	Concurrent Engineering			1.0 Version	Product Design and Development 134	Quality
2.1.7	Design for X (Mfg/Assy/Maint/etc.)			1.0 Version	Product Design and Development 134	Quality
2.1.8	Drafting/Drawing/Engineering Graphics/Modeling			1.0 Version	Product Design and Development 134	Quality
2.1.9	CAD/CAM/CAE Applications	2.0 Version	Introduction to CAD and CAM for Machining 241	CNC Machining		
2.1.10	Tolerance Analysis/GD & T	2.0 Version	Introduction to GD&T 301	Inspection		
2.1.11	Product Liability	1.0 Version	Product Design and Development 134	Quality		

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3.0 Manufacturing Process Applications & Operation	3.1 Manufacturing Process Applications and Operation	2.2.1	Process R&D	1.0 Version	Process Design and Development 133	Quality
		2.2.2	Simulation/Process Analysis	1.0 Version	Process Design and Development 133	Quality
		2.2.3	Product Prototype Build and Test	1.0 Version	Process Design and Development 133	Quality
		2.2.4	Process Development and Test	1.0 Version	Process Design and Development 133	Quality
		2.2.5	Print Reading	2.0 Version	Blueprint Reading 131	Applied Mathematics
		2.2.6	Rapid Prototyping	1.0 Version	Process Design and Development 133	Quality
		3.1.1	Material Removal Processes	2.0 Version	Cutting Processes 111	Metal Cutting
		3.1.1	Material Removal Processes	2.0 Version	Cutting Processes 111	Metal Cutting
		3.1.2	Fabrication Processes	1.0 Version	Manufacturing Process Applications: Part I 124	Applied Mathematics
		3.1.2	Fabrication Processes	1.0 Version	Punch and Die Operations 120	Stamping
		3.1.3	Hot and Cold Forming Processes	1.0 Version	Manufacturing Process Applications: Part II 125	Applied Mathematics
3.1.4	Casting and Molding Processes	1.0 Version	Manufacturing Process Applications: Part I 124	Applied Mathematics		
3.1.5	Electrical/Electronics Mfg. Processes	1.0 Version	Manufacturing Process Applications: Part II 125	Applied Mathematics		
3.1.6	Heat Treatment Processes	2.0 Version	Essentials of Heat Treatment of Steel 211	Materials		
3.1.7	Joining, Welding, and Assembly Processes	1.0 Version	Intro to Assembly 100	Fasteners		
3.1.7	Joining, Welding, and Assembly Processes	2.0 Version	Introduction to Welding Processes 151	Welding		
3.1.8	Finishing Processes	1.0 Version	Manufacturing Process Applications: Part II 125	Applied Mathematics		
3.1.9	Bulk and Continuous Flow Processes	1.0 Version	Manufacturing Process Applications: Part I 124	Applied Mathematics		
3.1.10	Material Handling/Packaging	1.0 Version	Manufacturing Process Applications: Part II 125	Applied Mathematics		
3.1.11	Hand Tool Use/Machine Operating	2.0 Version	Hand and Power Tool Safety 201	Safety		
4.0 Production System and Equipment Design/Development	4.1 Production System Design and Development	4.1.1	Infrastructure/Plant Location Analysis	1.0 Version	Production System Design and Development 136	Quality
		4.1.2	Facility Planning/Plant Layout	1.0 Version	Production System Design and Development 136	Quality
		4.1.3	Process Planning & Development	1.0 Version	Production System Design and Development 136	Quality
		4.1.4	Capacity Planning	1.0 Version	Production System Design and Development 136	Quality
		4.1.5	Production/Manufacturing System Design & Organization	1.0 Version	Production System Design and Development 136	Quality
		4.1.6	Process Documentation/Work Instructions	1.0 Version	Production System Design and Development 136	Quality
		4.1.7	Tool and Equipment Selection	1.0 Version	Production System Design and Development 136	Quality
		4.1.8	Production System Build/Test	1.0 Version	Production System Design and Development 136	Quality
		4.1.9	Human Factors, Ergonomics, and Safety	1.0 Version	Production System Design and Development 136	Quality
		4.1.10	Maintenance Systems	1.0 Version	Production System Design and Development 136	Quality
4.0 Production System and Equipment Design/Development	4.2 Equipment/Tool Design and Development	4.1.10	Environmental Protection/Waste Management	1.0 Version	Production System Design and Development 136	Quality
		4.2.1	Cutting Tool Design	2.0 Version	Lathe Tool Geometry 351	Metal Cutting
		4.2.1	Cutting Tool Design	2.0 Version	Mill Tool Geometry 361	Metal Cutting
		4.2.1	Cutting Tool Design	2.0 Version	Drill Tool Geometry 371	Metal Cutting
		4.2.2	Workholding Tool Design	2.0 Version	Supporting and Locating Principles 111	Workholding
		4.2.2	Workholding Tool Design	2.0 Version	Fixture Design Basics 201	Workholding
		4.2.3	Die/Mold Design	1.0 Version	Equipment/Tool Design and Development 137	Quality
		4.2.4	Gage Design	1.0 Version	Equipment/Tool Design and Development 137	Quality
		4.2.5	Machine Design	1.0 Version	Equipment/Tool Design and Development 137	Quality
		4.2.6	Power Systems (Mech/Elec/Fluid)	2.0 Version	Power Transmission Components 201	Fluid Systems
4.2.6	Power Systems (Mech/Elec/Fluid)	2.0 Version	Introduction to Hydraulic Components 221	Fluid Systems		
4.2.6	Power Systems (Mech/Elec/Fluid)	2.0 Version	Introduction to Pneumatic Components 231	Fluid Systems		
4.2.7	Control Systems (Mech/Elec/Fluid)	2.0 Version	Introduction to PLCs 201	PLCs: Allen Bradley/Rockwell		
4.2.7	Control Systems (Mech/Elec/Fluid)	1.0 Version	Basics of Siemens PLCs 200	PLCs: Siemens		
4.2.8	Nanotechnology, Packaging & Systems	1.0 Version	Equipment/Tool Design and Development 137	Quality		
5.0 Automated Systems and Control	5.1 Automated Systems and Control	5.1.1	Automated Systems (Hard/Flexible)	1.0 Version	Automated Systems and Control 135	Robotics
		5.1.2	CNC/PLC/Computer Control	2.0 Version	Basics of G Code Programming 231	CNC Machining
		5.1.2	CNC/PLC/Computer Control	1.0 Version	Basics of Ladder Logic 220	PLCs: Allen Bradley/Rockwell
		5.1.2	CNC/PLC/Computer Control	1.0 Version	Basic Ladder Diagram Programming for Siemens PLCs 280	PLCs: Siemens
		5.1.3	Computer Systems and Networks	1.0 Version	Networking for PLCs 270	PLCs: Allen Bradley/Rockwell
		5.1.3	Computer Systems and Networks	1.0 Version	Siemens PLC Communication 230	PLCs: Siemens
		5.1.4	Information Technology/Database Systems (MIS, etc.)	1.0 Version	Automated Systems and Control 135	Robotics

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6.0 Quality and Customer Service	6.1 Quality and Customer Service	5.1.5	Enterprise-wide Systems Integration (MES, ERP, etc.)	1.0 Version	Automated Systems and Control 135	Robotics
		6.1.1	Customer Focus (Research/Test/Satisfaction)	1.0 Version	Quality and Customer Service 175	Quality
		6.1.2	Quality System and Standards (e.g. QS/ISO/CE/Mark/etc.)	2.0 Version	ISO 9001: 2015 Review 122	Quality
		6.1.3	Probability and Statistics	2.0 Version	Statistics 231	Applied Mathematics
		6.1.4	Statistical Control Methods (Sampling/Charting/etc.)	2.0 Version	SPC Overview 211	Quality
		6.1.5	Problem Analysis & Solving (Fishbone/Pareto/FMEA/etc.)	2.0 Version	Troubleshooting 181	Quality
		6.1.6	Factor Analysis (DOE/Correlation/etc.)	1.0 Version	Quality and Customer Service 175	Quality
		6.1.7	Capability Analysis (Process/Equipment/etc.)	1.0 Version	Quality and Customer Service 175	Quality
		6.1.8	Inspection/Test/Validation	1.0 Version	Quality and Customer Service 175	Quality
		6.1.9	Metrology	1.0 Version	Quality and Customer Service 175	Quality
7.0 Manufacturing Management	7.1 Manufacturing Management	6.1.10	Reliability Analysis	1.0 Version	Quality and Customer Service 175	Quality
		6.1.11	Continuous Improvement/Lean	2.0 Version	Lean Manufacturing Overview 101	Quality
		6.1.12	Customer and Field Service	1.0 Version	Quality and Customer Service 175	Quality
		7.1.1	Strategic Planning/Global Competitiveness	1.0 Version	Manufacturing Management 180	Supervisor Essentials
		7.1.2	Organizational Design and Management	1.0 Version	Manufacturing Management 180	Supervisor Essentials
		7.1.3	Project Management	1.0 Version	Manufacturing Management 180	Supervisor Essentials
		7.1.4	Personnel Management Methods	1.0 Version	Manufacturing Management 180	Supervisor Essentials
		7.1.5	Human Behavior/Motivation/Leadership	1.0 Version	Manufacturing Management 180	Supervisor Essentials
		7.1.6	Labor Relations	1.0 Version	Manufacturing Management 180	Supervisor Essentials
		7.1.7	Education/Training	1.0 Version	Manufacturing Management 180	Supervisor Essentials
7.1.8	Operations Research, Analysis, & Forecasting	1.0 Version	Manufacturing Management 180	Supervisor Essentials		
8.0 Personal Effectiveness	8.1 Personal Effectiveness	7.1.9	Supply Chain & Logistics	1.0 Version	Manufacturing Management 180	Supervisor Essentials
			Accounting/Finance/Economics (including Engineering Economics/Cost Justification/Value Analysis/Project Justification)	1.0 Version	Manufacturing Management 180	Supervisor Essentials
		7.1.10	Business/Engineering Ethics and Social Responsibility	1.0 Version	Manufacturing Management 180	Supervisor Essentials
		7.1.11	Standards, Laws, and Regulations	1.0 Version	Manufacturing Management 180	Supervisor Essentials
		7.1.12	Standards, Laws, and Regulations	1.0 Version	Manufacturing Management 180	Supervisor Essentials
		8.1.1	Interpersonal Skills	1.0 Version	Personal Effectiveness 190	Supervisor Essentials
		8.1.2	Negotiating & Conflict Management	1.0 Version	Personal Effectiveness 190	Supervisor Essentials
		8.1.3	Presentation Skills & Oral Communication	1.0 Version	Personal Effectiveness 190	Supervisor Essentials
		8.1.4	Written Communication Skills	1.0 Version	Personal Effectiveness 190	Supervisor Essentials
		8.1.5	Innovation & Creativity	1.0 Version	Personal Effectiveness 190	Supervisor Essentials
8.1.6	Learning & Knowledge	1.0 Version	Personal Effectiveness 190	Supervisor Essentials		