Crosswalk between SCSD Semiconductor Microchip Technology and AFT Framework

Note: For SCSD, the quarter and unit name where corresponding student key questions and student learning targets are located is identified.

		SCSD Level 100	SCSD Level 200	SCSD Level 300	SCSD Level 400
Year 1: Unit 1: Introduction to Technology and Advanced Production					
1.1	Introduce students to the realm of advanced production and its significance in contemporary industries. Students will identify crucial concepts and processes related to advanced production. Students will explain the significance of advanced production in modern industry.	Q1-Introduction to Semiconductor Manufacturing and Careers Q1-History of Semiconductor Manufacturing			
1.2	Familiarize students with the fundamentals of semiconductors and their role in technology. Students will define semiconductors and elucidate their importance in various technological applications. Students will display an understanding of semiconductors and their role in technology.	Q1-Introduction to Semiconductor Manufacturing and Careers Q1-History of Semiconductor Manufacturing			
1.3	Provide an overview of the Internet of thing (IoT) and its applications in advanced production. Students will describe the fundamental principles and components of the IoT. Students will identify IoT applications in advanced production.			Q1-Programming Fundamentals	

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Year1 Unit 2: Computing Systems and Networks					
1.2.1	Introduce students to the components and functions of computing systems. Students will identify and describe the key components of a computing system. Students will identify and describe the functions of various components of a computing system.	Q3-Digital Literacy		Q1-Programming Fundamentals	
1.2.2	Develop an understanding of network topologies, protocols, and security. Students will explain different network topologies, protocols, and their significance in data communication. Students will demonstrate an understanding of network protocols and topologies by successfully establishing a small network and resolving connectivity issues.	Q3-Digital Literacy			
1.2.3	Familiarize students with operating systems and software installation. Students will demonstrate the ability to install and configure software on an operating system. Students will install and configure software on an operating system and document the process in a step-by-step guide.			Q2-Programming Fundamentals-Part 2	Q4 Extended Independent Project
Unit 3: Raspberry Pi Programming					
1.3.1	Introduce students to Raspberry Pi and its applications. Students will	Q1-Introduction to Programming			

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	describe the applications and capabilities of Raspberry Pi in various projects.				
1.3.2	Teach programming languages, such as Python or Lynx, for controlling and interacting with Raspberry Pi. Students will write and execute Python programs to control and interact with Raspberry Pi. Students will demonstrate proficiency in writing and executing the Python programs for Raspberry Pi	Q1-Introduction to Programming		Q1-Introduction to Programming Fundamentals	
1.3.3	Engage students in hand-on projects utilizing Raspberry PI. Students will apply programming skills to complete hands-on projects using Raspberry Pi.	Q1-Introduction to Programming		Q1 and Q2- Introduction to Programming Fundamentals. Q4-Programmable Logic Controls	
Unit 4: Introduction to Micro-credentials					
1.4.1	Recognize the importance of micro-credentials in the technology industry.	Q1-Basic Safety Q1-Introduction to Semiconductor Manufacturing and Careers			
1.4.2	Introduction to industry-recognized micro-credentials by CISCO CompTIA, Certiport, etc. Examples are: CISCO certified IoT Specialist, CompTIA A+, CompTIA Fundamentals (ITF+)	Q1-Introduction to Semiconductor Manufacturing and Careers			
1.4.3	Explore diverse pathways and certifications available in the field of	Q1-Introduction to Semiconductor	Q1-Career Exploration Q4-Career Exploration	Q4-Career Exploration and Reflection	Q1-Goal Setting and Career Exploration

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	semiconductors and advanced manufacturing.	Manufacturing and Careers Q4-Career Exploration and Reflection			
Unit 5: Industrial Electricity 1 (PMMI) : *Note this is referenced as unit 4 in some places. Other places this unit is included in year 2 or intermediate level.*					
1.5.1	Introduce students to electrical principles and safety in an industrial setting. Student will explain basic electrical principles and safety practices in an industrial environment.		Q2-Introduction to Industrial Electricity Part 1 Q3-Introduction to Industrial Electricity Part 2		
1.5.2	Teach about electrical systems, circuits, and components. Student will identify and describe electrical systems, circuits, and components. And demonstrate knowledge by labeling.		Q3-Introduction to Industrial Electricity Part 2 Q3-Circuits		
1.5.3	Provide an understanding of electrical troubleshooting techniques and preventive maintenance. Student will apply troubleshooting techniques and preventive maintenance procedures to electrical systems.		Q3-Introduction to Industrial Electricity Part 2		
Year 2: Unit 1: Semiconductors and Integrated Circuits					
2.1.1	In-depth study of semiconductors, including band theory and doping	Q3-Introduction to Material Science			

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		Q4-Applied Chemistry and Process of Sand to Semiconductor			
2.1.2	Understanding of the fabrication process of integrated circuits.	Q3-Introduction to Material Science Q4-Applied Chemistry and Process of Sand to Semiconductor			
2.1.3	Exploring various types of semiconductor devices and their applications.	Q3-Introduction to Material Science Q4-Applied Chemistry and Process of Sand to Semiconductor			
Unit 2: Internet of Things (IoT) and Advanced Manufacturing					
2.2.1	Delving deeper in the concept of IoT and its applications in advanced manufacturing			Q1 and Q2-Introduction to Programming Fundamentals.	
2.2.2	Understanding the communication protocols utilized in IoT systems.			Q1 and Q2-Introduction to Programming Fundamentals.	Q4-Extended Independent Project
2.2.3	Analyzing real-world case studies and actively participating in IoT projects			Q1 and Q2-Introduction to Programming Fundamentals.	Q4-Extended Independent Project
Unit 3: Computer-Aided Design (CAD)					
2.3.1	Introduction to CAD software and its applications in advanced manufacturing.	Q2-Technical Drawing Q2-Introduction to Engineering Design			
2.3.2	Learning both 2D and 3D modeling techniques.	Q2-Technical Drawing			

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		Q2-Introduction to Engineering Design			
2.3.3	Applying design principles and implementing best practices for manufacturing purposes.	Q2-Introduction to Engineering Design			
Unit 4: Advanced Semiconductor Techniques *(also found in year 3- advanced level)*					
2.4.1	In-depth examination of advanced semiconductor materials and fabrication techniques used in cutting-edge technologies	Q1-History of Semiconductor Manufacturing Q3-Introduction to Material Science			
2.4.2	Exploring emerging technologies such as nanotechnology and quantum computing and impact on semiconductor manufacturing			Q4- Ethics and Emerging Technologies	
2.4.3	Understanding the challenges faced and future trends in semiconductor *research and development* and, manufacturing.			Q4-Ethics and Emerging Technologies	
Unit 5: OSHA 10 General Industry Certification *This is also found in level 3-advanced*					
2.5.1	Acquiring knowledge of workplace safety regulations and best practices.	Q1-Basics Safety in the Work Environment	Q1-Safety Review Q1-Cleanroom Protocols and Etiquette	Q1-Safety Review	Q1-Goal Setting and Career Exploration Q1-Employee Safety and Protection
2.5.2	Understanding the identification of hazards, risk assessment, and implementing preventive measures.	Q1-Basics Safety in the Work Environment	Q1-Safety Review Q1-Cleanroom Protocols and Etiquette	Q1-Safety Review	Q1-Goal Setting and Career Exploration Q1-Employee Safety and Protection

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2.5.3	Preparing for he OSHA 10 General Industry certification exam.	Q1-Basics Safety in the Work Environment			
Year 3: Unit 1: Advanced Manufacturing Processes and Automation					
3.1.1	Exploring advanced manufacturing techniques, including additive manufacturing and robotics.	Q2-Introduction to Engineering Design		Q4-Programmable Logic Controls	
3.1.2	Understanding process optimization and the role of automation in manufacturing			Q4-Programmable Logic Controls	
3.1.3	Analyzing case studies and actively participating in hands-on projects.				Q2-Failure Analysis Q2-Statistical Process Control Q3-Internship
Unit 2: Project and Challenge-Based Learning		Note: Projects are integrated into each quarter for SCSD. In the draft curriculum, there is a suggested driving question for a project. The Driving Question often incorporates learning from 1 or more units to apply skills and knowledge to a relevant real world applied situation.			
3.2.1	Engaging in project-based learning to apply the knowledge and skills acquired throughout the curriculum	Q1-Introduction to Semiconductor	Q1-Cleanroom: Protocols and Etiquette	Q1-Technical Reading and Writing	Q2-Preparing for internship: Preparing for Workforce

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		Manufacturing and Careers Q1-History of Semiconductor Manufacturing Q2-Technical Drawing Q2-Introduction to Engineering Design Q3-Digital Literacy Q3-Career Exploration and Employability Q4-Applied Chemistry: The Process of Sand to semiconductor Q4-Introuction to Photolithography	Q2-Applied Math-Part 2 Q2-Tools and Gauges Q2-Introduction to Industrial Electricity-Part 1 Q3-Introduction to Industrial Electricity-Part 2 Q3-Motors and Controls Q3-Circuits Q4-Logic Gates Q4-Vacuum: What, Why and How Q4-Career Exploration	Q1-Programming Fundamentals Part 1 Q2-Programming Fundamentals Part 2 Q2-Introduction to Problem Solving Q3-Fluid Power Q3-Mechanisms Q4-Ethics and Future Trends	Q3-Internship Q4- Internship Synthesis and Evaluation Q4-Extended Independent Project
3.2.2	Solving real-world problems related to semiconductors and advanced manufacturing applying critical thinking, problem-solving, and teamwork	Q2-Technical Drawing Q2-Introduction to Engineering Design Q4-Applied Chemistry: The Process of Sand to semiconductor Q4-Introuction to Photolithography	Q1-Cleanroom: Protocols and Etiquette Q1-Cleanroom: Protocols and Etiquette Q2-Applied Math-Part 2 Q2-Tools and Gauges Q2-Introduction to Industrial Electricity-Part 1 Q3-Introduction to Industrial Electricity-Part 2	Q1-Technical Reading and Writing Q1-Programming Fundamentals Part 1 Q2-Programming Fundamentals Part 2 Q2-Introduction to Problem Solving Q3-Fluid Power Q3-Mechanisms Q4-Ethics and Future Trends	Q2-Preparing for internship: Preparing for Workforce Q3-Internship Q4-Internship Synthesis and Evaluation Q4-Extended Independent Project

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			Q3-Motors and Controls Q3-Circuits Q4-Logic Gates Q4-Vacuum: What, Why and How Q4-Career Exploration		
3.2.3	Fostering creativity, innovation, critical thinking, and teamwork skills.	Q1-Introduction to Semiconductor Manufacturing and Careers Q1-History of Semiconductor Manufacturing Q2-Technical Drawing Q2-Introduction to Engineering Design Q3-Digital Literacy Q3-Career Exploration and Employability Q4-Applied Chemistry: The Process of Sand to semiconductor Q4-Introuction to Photolithography	Q1-Cleanroom: Protocols and Etiquette Q1-Cleanroom: Protocols and Etiquette Q2- Applied Math-Part 2 Q2-Tools and Gauges Q2-Introduction to Industrial Electricity-Part 1 Q3-Introduction to Industrial Electricity-Part 2 Q3-Motors and Controls Q3-Circuits Q4-Logic Gates Q4-Vacuum: What, Why and How Q4-Career Exploration	Q1-Technical Reading and Writing Q1-Programming Fundamentals Part 1 Q2-Programming Fundamentals Part 2 Q2-Introduction to Problem Solving Q3-Fluid Power Q3-Mechanisms Q4-Ethics and Future Trends	Q2-Preparing for internship: Preparing for Workforce Q3-Internship Q4-Internship Synthesis and Evaluation Q4-Extended Independent Project
Unit 3: Online Tools and Resources for Advanced Manufacturing					

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3.3.1	Exploring a variety of online tools and software used in advanced manufacturing processes.			Q1 and Q2-Programming Fundamentals	
3.3.2	Learning simulation and modeling software for process optimization			Q2-Programming fundamentals-Part 2 Q2-Introduction to Problem Solving	Q2-Failure Analysis Q2-Statistical Process Control
3.3.3	Understanding data analysis and visualization techniques relevant to manufacturing.			Q1-Technical Reading and Writing Q2-Introduction to Problem Solving Q4-Presentation with Data and Visuals	Q2- Statistical Process Control
Unit 4: Advanced Networking and Cybersecurity					
3.4.1	In-depth study of advanced networking concepts, protocols, and their application.		?		Q4-Extended Independent Project
3.4.2	Understanding network security principles and implementing best practices.				Q4 Extended Independent Project
3.4.3	Exploring cybersecurity threats and strategies for prevention.				Q4-Extended Independent Project
Unit 5: Capstone Project		Note: Projects are integrated into each quarter for SCSD. In the draft curriculum, there is a suggested driving question for projects.			
3.5.1	Undertaking a comprehensive capstone project that integrates				Q1-Career Preparedness and Application

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	knowledge for all areas of the curriculum				Q1-Preparation for Internship: Applying and Interviewing Q2-Preparation for Internship: Preparing for Workforce Q3-Internship Q4-Internhsip Synthesis and Evaluation Q4-Extended Independent Project
3.5.2	Demonstrating problem solving, critical thinking, and presentation skills.				Q1-Career Preparedness and Application Q1-Preparation for Internship: Applying and Interviewing Q2-Preparation for Internship: Preparing for Workforce Q3-Internship Q4-Internhsip Synthesis and Evaluation Q4-Extended Independent Project
3.5.3	Showcasing the practical application of advanced manufacturing and semiconductor concepts.				Q1-Career Preparedness and Application Q1-Preparation for Internship: Applying and Interviewing

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					Q2-Preparation for Internship: Preparing for Workforce Q3-Internship Q4-Internhsip Synthesis and Evaluation Q4-Extended Independent Project

Topics included in SCSD draft curriculum but not noted in this draft crosswalk:

- Technical Math
- Introduction to Engineering Design
- Digital Literacy
- Introduction to Photolithography (as foundation to semiconductor manufacturing process)
- Cleanroom Protocols and Etiquette
- Applied Physics of Light
- Basics of Refrigeration
- Tools and Gauges
- Motors and Controls
- Vacuum: What, Why and How
- Technical Reading and Writing
- Introduction to Problem Solving
- Fluid Power
- Mechanisms
- An integrated emphasis on employability skills and career development