MICROELECTRONICS TECHNOLOGY

MICROELECTRONICS TECHNOLOGY

pcc.edu/programs/microelectronics/

CAREER AND PROGRAM DESCRIPTION

You don't have to be tech-savvy to have a well-paid, fulfilling career in high-tech. A degree in Microelectronics Technology (MT) will give you the skills to maintain and repair the advanced process equipment and automation used in the fast-growing semiconductor manufacturing industry.

- Portland is considered to be the "Silicon Forest" of the world, with a large semiconductor manufacturing base.
- Intel Corporation is the Portland region's largest private employer, and there are many others including: Analog Devices, Qorvo, Microchip, Lam Research, Applied Materials, TEL, Siltronic, Biotronik/MSEI, FEI/Thermo Fisher.
- MT graduates starting salary can be over $60,000 per year, with overtime pay, shift differential pay, extensive benefits including full health coverage, retirement saving plans, tuition reimbursement, Personal Time Off (PTO), paid holidays and more.
- Technicians work a regular fixed schedule: Compressed Work Week (CWW) of 12-hour shifts: 3-days one week (with four days off) followed by the second week working four days (with three days off).
- There is opportunity for advancement and to make this a lifelong career.
- Military veterans have a long history working in this industry; technical military training can often be applied towards the MT credit requirements.
- Most, if not all, industry partners welcome and mention hiring initiatives in their employment materials to encourage veterans and members of protected classes to apply.

What you would do as a Technician:

- Help keep high tech fabrication facilities up and running.
- Work in teams solving problems, managing logistics, and practicing good communication.
- Work in clean room environments to maintain equipment and monitor various manufacturing processes.

What you would experience as an MT student:

- Receive the technical training needed to work in this high-tech environment.
- Most MT courses involve a hands-on laboratory component to develop equipment analysis, maintenance, and troubleshooting skills.
- Develop oral and written communication skills in the English language.
- Students may begin during any term of the academic year, however MT course sequences must start in fall or winter term.
- First year courses must be completed before starting the second year.
- Day classes are scheduled to accommodate the industry standard work CWW schedule enabling those students working CWW schedules to take courses.
- Evening classes are also available for 100 level MT courses.
- MT students who have little or no work experience in the semiconductor field have a chance to an early start in their technical career by applying to one of the paid Internship/ Apprenticeship programs available with companies such as: Intel, Lam, Microchip, Jireh, and Qorvo. (Availability and starting pay may vary.)

How long will the MT program take to complete?

- Full-time students can complete the program in six to eight terms.
- Part-time students complete the program over a longer time.
- The core MT classes require two full academic years (six terms) in order to be completed.

Can my MT credits apply towards an advanced degree?

- Yes, up to 58 credits can apply toward a four-year baccalaureate degree.
- Graduates of the MT program may also transfer all of their credits to Oregon Institute of Technology (OIT) to pursue a bachelors degree in Electronic Engineering Technology (EET).
- This allows the possibility to complete a bachelor's degree in two additional years.
- Upper division OIT courses are offered at OIT's Wilsonville Campus.

DEGREES AND CERTIFICATES OFFERED

ASSOCIATE OF APPLIED SCIENCE DEGREE

Microelectronics Technology
Microelectronics Technology: Automated Manufacturing Technology Option
Microelectronics Technology: Solar Voltaic Manufacturing Technology Option

LESS THAN ONE-YEAR CERTIFICATE

Mechatronics

LESS THAN ONE-YEAR: CAREER PATHWAY CERTIFICATE

Solar Voltaic Manufacturing Technology

Academic Prerequisites

- None

Academic Requirements

- None

Non-Academic Prerequisites

- New students are encouraged to meet with a department representative for advising prior to signing up for classes.

Non-Academic Requirements

- None

ASSOCIATE OF APPLIED SCIENCE DEGREE

Microelectronics Technology (p. 1)
Microelectronics Technology: Automated Manufacturing Technology Option (p. 2)
Microelectronics Technology: Solar Voltaic Manufacturing Technology Option (p. 3)

MICROELECTRONICS TECHNOLOGY AAS DEGREE

Minimum 95 credits. Students must also meet Associate Degree Comprehensive Requirements and Associate of Applied Science Requirements. Students must complete a total of four courses of General Education. Some courses specified within the program may be used as General Education. Math/computation competency is met through the courses in the program of study indicated with a § symbol. Students should consult with program advisors for academic planning.

MICROELECTRONICS TECHNOLOGY

Course of Study

The coursework listed below is required. Students should work with an MT advisor regarding proper sequencing and limited offerings.

Code	Title	Credits
CH 104	Allied Health Chemistry I *	5
or CH 151	Preparatory Chemistry	
or CH 221	General Chemistry I	
CH 105	Allied Health Chemistry II	5
or CH 222	General Chemistry II	
COMM 130	Business & Professional Communication	4
or COMM 215	Communicating in Teams and Small Groups	
MT 101	Introduction to Semiconductor Manufacturing	1
MT 102	Introduction to Semiconductor Devices	1
MT 103	Introduction to Micro and Nano Processing	1
MT 108	Statistics for Process Control	2
or STAT 243	Elementary Statistics I (MTH/STAT243=STAT243Z)	
MT 111A	DC and AC Electronics Intro [1]	4
MT 112A	DC and AC Electronics [1]	4
MT 113A	Applications of Semiconductor Devices A [2]	2
MT 113B	Applications of Semiconductor Devices B [2]	2
MT 121A	Digital Electronics Intro	2
MT 122A	Digital Electronics	4
MT 151	Intro to Hand Tools and Mechanical Assembly	1
MT 163	Pneumatics	2
MT 173	Sensors, Power Amps and Motors	2
MT 200	Semiconductor Processing	3
MT 222	Quality Control Methods in Manufacturing	3
MT 223	Vacuum Technology	3
MT 224	Process Equipment I §	3
MT 227	Process Equipment II	3
MT 228	Process Equipment III	4
MT 240	RF Plasma Systems	3
MT 288	High Tech Employment Strategies	1
PHY 201	General Physics *	4
or PHY 211	General Physics (Calculus)	
PHY 202	General Physics	4
or PHY 212	General Physics (Calculus)	
PHY 203	General Physics	4
or PHY 213	General Physics (Calculus)	
WR 121	Composition I (WR121=WR121Z) Z	4
WR 227	Technical Writing (WR227=WR227Z) Z	4
Microelectronics Program Communication Elective *,3		4
General Education: 2 courses		
Total Credits		95

*
Could be used as General Education.

§
Course cannot be substituted for another course.

1
Students who have taken MT 111 and MT 112 can substitute both for MT 111A and MT 112A.

2
MT 113 can be substituted for (MT 113A and MT 113B).

3
Take one course from the COMM Elective list not already taken.

Z
This course is part of Oregon Common Course Numbering. The following courses are equivalent:
MTH 243, STAT 243, and STAT 243Z
WR 121 and WR 121Z
WR 227 and WR 227Z

MICROELECTRONICS PROGRAM COMMUNICATION ELECTIVES

Code	Title	Credits
COMM 111	Public Speaking (COMM111=COMM111Z) Z	4
COMM 130	Business & Professional Communication	4
COMM 140	Introduction to Intercultural Communication	4
COMM 215	Communicating in Teams and Small Groups	4
COMM 218	Interpersonal Communication (COMM214=COMM218=COMM218Z) Z	4

Z
This course is part of Oregon Common Course Numbering. The following courses are equivalent:
COMM 111 and COMM 111Z
COMM 214, COMM 218, and COMM 218Z

AUTOMATED MANUFACTURING TECHNOLOGY AAS DEGREE

Minimum 90 credits. Students must also meet Associate Degree Comprehensive Requirements and Associate of Applied Science Requirements. Students must complete a total of four courses of General Education. Some courses specified within the program may be used as General Education. Math/computation competency is met through the courses in the program of study indicated with a § symbol. Students should consult with program advisors for academic planning.

Course of Study

The coursework listed below is required. Students should work with an MT advisor regarding proper sequencing and limited offerings.

Code	Title	Credits
CIS 179	Data Communication Concepts I	4
CIS 278A	Cisco 1: Introduction to Networks	4
or CIS 188	Introduction to Wireless Networking	
COMM 130	Business & Professional Communication	4
or COMM 215	Communicating in Teams and Small Groups	
CS 161A	Programming and Problem Solving I	4
CS 161B	Programming and Problem Solving II	4
MT 101	Introduction to Semiconductor Manufacturing	1
MT 102	Introduction to Semiconductor Devices	1
MT 103	Introduction to Micro and Nano Processing	1
or MT 104	Introduction to Solar Voltaic Processing	

MICROELECTRONICS TECHNOLOGY

MT 108	Statistics for Process Control	2
or STAT 243	Elementary Statistics I (MTH/STAT243=STAT243Z)	
MT 111A	DC and AC Electronics Intro [1]	4
MT 112A	DC and AC Electronics [1]	4
MT 113A	Applications of Semiconductor Devices A [2]	2
MT 113B	Applications of Semiconductor Devices B [2]	2
MT 121A	Digital Electronics Intro	2
MT 122A	Digital Electronics	4
MT 131	Introduction to Programmable Logic Controllers	2
or ELT 125	Basic Programmable Logic Controllers	
MT 151	Intro to Hand Tools and Mechanical Assembly	1
MT 163	Pneumatics	2
MT 173	Sensors, Power Amps and Motors	2
MT 222	Quality Control Methods in Manufacturing	3
MT 224	Process Equipment I [§]	3
MT 227	Process Equipment II	3
MT 228	Process Equipment III	4
MT 288	High Tech Employment Strategies	1
PHY 201	General Physics [*]	4
or PHY 211	General Physics (Calculus)	
WR 121	Composition I (WR121=WR121Z) [Z]	4
WR 227	Technical Writing (WR227=WR227Z) [Z]	4
Automation Elective (PLC track ONLY) [3]		(4)
Automation Elective (Microcomputer track ONLY) [3]		4
Microelectronics Program Communication Electives [*,4]		4
General Education: 2 courses		
Total Credits		90

[*]
Could be used as General Education.

[§]
Course cannot be substituted for another course.

[1]
Students who have taken MT 111 and MT 112 can substitute both for MT 111A and MT 112A.

[2]
MT 113 can be substituted for (MT 113A and MT 113B).

[3]
All students must earn 4 credits from the Automation Elective list. Students choosing the PLC track within this list should take a 2-credit course from this track in the 5th term and a 2-credit course from this track in the 6th term. Students choosing the Microcomputer track should take a 4-credit course from this track in the 6th term.

[4]
Take one COMM course from the elective list not already taken.

[Z]
This course is part of Oregon Common Course Numbering. The following courses are equivalent:
MTH 243, STAT 243, and STAT 243Z
WR 121 and WR 121Z
WR 227 and WR 227Z

AUTOMATION ELECTIVES

Code	Title	Credits
Microcomputer Track		
CIS 145	Microcomputer Hardware and Troubleshooting	4
or EET 178	Computing Environments for Technicians	
PLC Track		
ELT 126	Intermediate Programmable Logic Controllers (PC Based)	2
ELT 225	Advanced Programmable Controllers, PC Based	2

MICROELECTRONICS PROGRAM COMMUNICATION ELECTIVES

Code	Title	Credits
COMM 111	Public Speaking (COMM111=COMM111Z) [Z]	4
COMM 130	Business & Professional Communication	4
COMM 140	Introduction to Intercultural Communication	4
COMM 215	Communicating in Teams and Small Groups	4
COMM 218	Interpersonal Communication (COMM214=COMM218=COMM218Z) [Z]	4

[Z]
This course is part of Oregon Common Course Numbering. The following courses are equivalent:
COMM 111 and COMM 111Z
COMM 214, COMM 218, and COMM 218Z

SOLAR VOLTAIC MANUFACTURING TECHNOLOGY AAS DEGREE

Minimum 91 credits. Students must also meet Associate Degree Comprehensive Requirements and Associate of Applied Science Requirements. Students must complete a total of four courses of General Education. Some courses specified within the program may be used as General Education. Math/computation competency is met through the courses in the program of study indicated with a § symbol. Students should consult with program advisors for academic planning.

Course of Study

The coursework listed below is required. Students should work with an MT advisor regarding proper sequencing and limited offerings.

Code	Title	Credits
CH 100	Everyday Chemistry with Lab (or higher) [*]	4
COMM 130	Business & Professional Communication	4
or COMM 215	Communicating in Teams and Small Groups	
MT 101	Introduction to Semiconductor Manufacturing	1
MT 102	Introduction to Semiconductor Devices	1
MT 104	Introduction to Solar Voltaic Processing	1
MT 108	Statistics for Process Control	2
or STAT 243	Elementary Statistics I (MTH/STAT243=STAT243Z)	
MT 111A	DC and AC Electronics Intro [1]	4
MT 112A	DC and AC Electronics [1]	4
MT 113A	Applications of Semiconductor Devices A [2]	2
MT 113B	Applications of Semiconductor Devices B [2]	2

MICROELECTRONICS TECHNOLOGY

MT 121A	Digital Electronics Intro	2
MT 122A	Digital Electronics	4
MT 131	Introduction to Programmable Logic Controllers	2
or ELT 125	Basic Programmable Logic Controllers	
MT 151	Intro to Hand Tools and Mechanical Assembly	1
MT 163	Pneumatics	2
MT 173	Sensors, Power Amps and Motors	2
MT 200	Semiconductor Processing	3
MT 222	Quality Control Methods in Manufacturing	3
MT 223	Vacuum Technology	3
MT 224	Process Equipment I §	3
MT 227	Process Equipment II	3
MT 228	Process Equipment III	4
MT 240	RF Plasma Systems	3
MT 288	High Tech Employment Strategies	1
PHY 201	General Physics *	4
or PHY 211	General Physics (Calculus)	
PHY 202	General Physics	4
or PHY 212	General Physics (Calculus)	
PHY 203	General Physics	4
or PHY 213	General Physics (Calculus)	
WR 121	Composition I (WR121=WR121Z) Z	4
WR 227	Technical Writing (WR227=WR227Z) Z	4
Microelectronics Program Comunication Electives *,3		4
General Education: 2 courses		
Total Credits		91

*
Could be used as General Education.

§
Course cannot be substituted for another course.

1
Students who have taken MT 111 and MT 112 can substitute both for MT 111A and MT 112A.

2
MT 113 can be substituted for (MT 113A and MT 113B).

3
Take one course from the COMM Elective list not already taken.

Z
This course is part of Oregon Common Course Numbering. The following courses are equivalent:
MTH 243, STAT 243, and STAT 243Z
WR 121 and WR 121Z
WR 227 and WR 227Z

MICROELECTRONICS PROGRAM COMMUNICATION ELECTIVES

Code	Title	Credits
COMM 111	Public Speaking (COMM111=COMM111Z) Z	4
COMM 130	Business & Professional Communication	4
COMM 140	Introduction to Intercultural Communication	4
COMM 215	Communicating in Teams and Small Groups	4
COMM 218	Interpersonal Communication (COMM214=COMM218=COMM218Z) Z	4

Z
This course is part of Oregon Common Course Numbering. The following courses are equivalent:
COMM 111 and COMM 111Z
COMM 214, COMM 218, and COMM 218Z

LESS THAN ONE-YEAR CERTIFICATE

Mechatronics (p. 4)

LESS THAN ONE-YEAR: CAREER PATHWAY CERTIFICATE

Solar Voltaic Manufacturing Technology (p. 4)

MECHATRONICS LESS THAN ONE-YEAR CERTIFICATE

Minimum 36 credits. Students must meet all certificate requirements.

Mechatronics Less than One-Year Certificate Courses

Code	Title	Credits
MT 111A	DC and AC Electronics Intro	4
MT 113A	Applications of Semiconductor Devices A	2
MT 121A	Digital Electronics Intro	2
MT 131	Introduction to Programmable Logic Controllers	3
MT 132	Programmable Logic Controller Application in Mechatronics	3
MT 151	Intro to Hand Tools and Mechanical Assembly	1
MT 153	Assembly of Mechanical Systems II	3
MT 155	Mechanical Systems	5
MT 163	Pneumatics	2
MT 165	Hydraulics	2
MT 173	Sensors, Power Amps and Motors	2
MT 175	AC Motors - Control, Maintenance, and Troubleshooting	2
MT 177	Industrial Robots I	3
MT 178	Mechatronics Capstone-Industrial Robots II	2
Total Credits		36

SOLAR VOLTAIC MANUFACTURING TECHNOLOGY CAREER PATHWAY CERTIFICATE

Minimum 15 credits. Students must meet all certificate requirements. The Solar Voltaic Manufacturing certificate is a Career Pathway. All courses are contained in the Solar Voltaic Manufacturing Technology AAS Degree.

Solar Voltaic Manufacturing Technology Certificate Courses

Code	Title	Credits
CH 100	Everyday Chemistry with Lab (or higher)	4
MT 101	Introduction to Semiconductor Manufacturing	1
MT 102	Introduction to Semiconductor Devices	1
MT 104	Introduction to Solar Voltaic Processing	1
MT 111A	DC and AC Electronics Intro	4
MT 121A	Digital Electronics Intro	2

MICROELECTRONICS TECHNOLOGY

MT 151	Intro to Hand Tools and Mechanical Assembly	1
MT 288	High Tech Employment Strategies	1
Total Credits		15