

ELE 206: SEMICONDUCTOR MANUFACTURING

Completed Workflow

1. AMTD Chair (acoleman10@wccnet.edu)
2. AT Dean (krue@wccnet.edu,esamulski@wccnet.edu)
3. C&A Assistant (aabooker@wccnet.edu)
4. Curricular Systems Coordinator (cacevans@wccnet.edu)
5. C&A Coordinator (sabird@wccnet.edu)
6. C&A Director (bjlinfoord@wccnet.edu)
7. Before Comm review (aabooker@wccnet.edu)
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9. After Comm review (sabird@wccnet.edu,bjlinford@wccnet.edu)
10. Curriculum Committee Chair (rvanwagnen@wccnet.edu)
11. Assessment Committee Chair (jhale15@wccnet.edu)
12. Before VPI (sabird@wccnet.edu)
13. Vice President for Instruction (hbhirth@wccnet.edu; brtucker@wccnet.edu)
14. Banner (cacevans@wccnet.edu)

Approval Path

1. 2026-01-04T07:37:32Z
Allan Coleman (acoleman10): Approved for AMTD Chair
2. 2026-01-04T10:56:21Z
Eva Samulski (esamulski): Approved for AT Dean
3. 2026-02-17T18:44:28Z
Ben Linford (bjlinfoord): Approved for C&A Assistant
4. 2026-02-23T13:57:54Z
Carol Evans (cacevans): Approved for Curricular Systems Coordinator
5. 2026-03-04T17:02:03Z
Ben Linford (bjlinfoord): Approved for C&A Coordinator
6. 2026-03-04T17:03:41Z
Ben Linford (bjlinfoord): Approved for C&A Director
7. 2026-03-06T20:11:49Z
Ben Linford (bjlinfoord): Approved for Before Comm review
8. 2026-03-13T20:32:06Z
Ben Linford (bjlinfoord): Approved for Comm Review step
9. 2026-03-17T14:18:59Z
Ben Linford (bjlinfoord): Approved for After Comm review
10. 2026-03-19T17:22:39Z
Randy Van Wagnen (rvanwagnen): Approved for Curriculum Committee Chair
11. 2026-03-19T17:36:47Z
Jessica Hale (jhale15): Approved for Assessment Committee Chair
12. 2026-03-20T15:27:08Z
Sera Bird (sabird): Approved for Before VPI
13. 2026-03-20T16:21:50Z
Brandon Tucker (brtucker): Approved for Vice President for Instruction
14. 2026-03-27T07:03:17Z
Approved for Banner

History

1. Nov 24, 2025 by Ben Linford (bjlinfoord)
2. Mar 27, 2026 by William Sturm (wjsturm)

Viewing: ELE 206 : Semiconductor Manufacturing

Changes proposed by: William Sturm (wjsturm)

Effective Term

Fall 2026

Rationale and proposal summary

Adding back missing outcomes and objectives info. Update Course Description to reflect the currently built course. General updates followed...

Course Cover

Full Course Title

Semiconductor Manufacturing

Transcript Title

Semiconductor Manufacturing

Subject Code

ELE - Electricity/Electronics

Course Number

206

Department

Advanced Manufacturing (AMTD)

Banner Division

ATP

Division/College

Adv Tech/Public Serv Careers (AT)

Org Code

14430

Course Description

In this course, students will study the fundamentals of manufacturing high technology semiconductor devices such as diodes, transistors, and integrated circuits. Students will explore the manufacturing process including the materials and methods used in production. Students will gain experience working in a clean room environment with hands on training in the operation and maintenance of vacuum systems. Emphasis will be placed on occupational safety, sensors, supervisory control and data acquisition (SCADA) and the use of graphical data such as statistical process control (SPC) to maintain high quality production systems.

Planned Delivery Format

Face to Face

Has this course been approved for virtual or blended virtual?

No

Has this course been approved for online or online blended?

No

Grading method

Standard Letter, Audit, Academic Forgiveness

CIP Code

159999 - Engineering/Engineering-Related Technologies/Technicians, Other.

Occupational Indicator

Yes

ACS Code

130

Credit hours, contact hours, repeatability

Repeatable for additional credit

No

Course credits

2

Lecture contact hours

15

Lab contact hours

30

Total Contact Hours

45

Expected Total Contact Hours

45

Prerequisites and prerequisite skill levels**College-Level Math**

Level 2

College-Level Reading and Writing

College-level Reading and Writing

Approved Level I Prerequisite:

Academic Reading and Writing Levels of 6; Academic Math Level 2; ELE 111 minimum grade "C"

Is concurrent enrollment an option for this prerequisite?

No

Course Assessment Plan**Learning Outcome****Outcome**

Identify the major concepts of the semiconductor manufacturing industry.

Assessment #1**Assessment Tool**

Outcome-related exam questions

Anticipated Next Assessment Year

2027

Anticipated Next Assessment Term

Fall

Assessment Cycle

Every Three Years

Anticipated assessment population

All students from all sections

How the assessment will be scored

Answer key

Who does the scoring?

Departmental faculty

Standard of success

70% of students will score 70% or higher.

Assessment #2

Learning Outcome

Outcome

Demonstrate proper procedures for working in a clean room environment.

Assessment #1

Assessment Tool

Outcome-related demonstration

Anticipated Next Assessment Year

2027

Anticipated Next Assessment Term

Fall

Assessment Cycle

Every Three Years

Anticipated assessment population

All students from all sections

How the assessment will be scored

Checklist

Who does the scoring?

Departmental faculty

Standard of success

70% of students will score 70% or higher.

Assessment #2

Learning Outcome

Outcome

Explain the purpose and operation of vacuum systems in semiconductor manufacturing.

Assessment #1

Assessment Tool

Outcome-related exam questions

Anticipated Next Assessment Year

2027

Anticipated Next Assessment Term

Fall

Assessment Cycle

Every Three Years

Anticipated assessment population

All students from all sections

How the assessment will be scored

Answer key and rubric

Who does the scoring?

Departmental faculty

Standard of success

70% of students will score 70% or higher.

Assessment #2**Learning Outcome****Outcome**

Describe the procedures for vacuum system performance testing.

Assessment #1**Assessment Tool**

Outcome-related exam questions

Anticipated Next Assessment Year

2027

Anticipated Next Assessment Term

Fall

Assessment Cycle

Every Three Years

Anticipated assessment population

All students from all sections

How the assessment will be scored

Outcome-related demonstration

Who does the scoring?

Departmental faculty

Standard of success

70% of students will score 70% or higher.

Assessment #2**Learning Outcome****Outcome**

Explain the concept of closed loop process control including data collection, data analysis, and corrective action plans.

Assessment #1**Assessment Tool**

Outcome-related exam questions

Anticipated Next Assessment Year

2026

Anticipated Next Assessment Term

Fall

Assessment Cycle

Every Three Years

Anticipated assessment population

All students from all sections

How the assessment will be scored

Written exam questions

Who does the scoring?

Department Faculty

Standard of success

70% of students will score 70% or higher.

Assessment #2

Course Objectives

	Objective(s)
1.	Define what a semiconductor is and explain what semiconductors are used for.
2.	Identify materials used in the semiconductor manufacturing industry.
3.	Explain the methods involved in manufacturing semiconductor wafers.
4.	Identify safety hazards associated with semiconductor manufacturing.
5.	Explain the importance of a clean environment in semiconductor manufacturing.
6.	Explain International Organization for Standardization (ISO) clean room standards and contamination control protocols.
7.	Demonstrate proper gowning and removal procedures.
8.	Demonstrate the use of various tools wearing clean room clothing (including gloves).
9.	Explain the importance of vacuum systems in semiconductor manufacturing.
10.	Describe the operating principles of vacuum systems components.
11.	Describe the methods used to perform leak checks.
12.	Demonstrate a vacuum leak check.
13.	Identify common sensors used in semiconductor manufacturing
14.	Explain the concept of normal variation
15.	Identify the components of a control chart.

General Education Area(s)

Area 1: Writing

No

Area 2: 2nd Writing or Communication/Speech

No

Area 3: Mathematics

No

Area 4: Natural Science

No

Area 5: Social and Behavioral Science

No

Area 6: Arts and Humanities

No

MTA General Education

No

Review

Is conditional approval requested?

No

Is this course currently conditionally approved, and you are now submitting it for full approval?

No

Reviewer Comments

Ben Linford (bjlinford) (2026-02-17T18:44:22Z): Pulling forward for expedited review -BL

Ben Linford (bjlinford) (2026-03-04T17:01:59Z): Pulling forward to get on next C&A Committee agenda -BL 3/4/26

Key: 4839

Washtenaw Community College Comprehensive Report

ELE 206 Semiconductor Manufacturing Effective Term: Fall 2025

Course Cover

College: Advanced Technologies and Public Service Careers

Division: Advanced Technologies and Public Service Careers

Department: Advanced Manufacturing

Discipline: Electricity/Electronics

Course Number: 206

Org Number: 14430

Full Course Title: Semiconductor Manufacturing

Transcript Title: Semiconductor Manufacturing

Is Consultation with other department(s) required: No

Publish in the Following:

Reason for Submission:

Change Information:

Rationale: New course

Proposed Start Semester: Fall 2025

Course Description: In this course, students will study the fundamentals of manufacturing semiconductor devices, such as integrated circuits (ICs), microprocessors, and memory chips. Students will explore the manufacturing process from materials and chemistry to the methods and technologies used in production. Students will gain experience working in a clean room manufacturing environment, as well as hands-on training in the operation and maintenance of vacuum systems.

Course Credit Hours

Variable hours: No

Credits: 2

Lecture Hours: Instructor: 15 **Student:** 15

Lab: Instructor: 30 **Student:** 30

Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 45 **Student:** 45

Repeatable for Credit: NO

Grading Methods: Letter Grades

Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math

Requisites

Prerequisite

ELE 111 minimum grade "C"

General Education

Request Course Transfer

Proposed For:**Student Learning Outcomes**

1. Identify the major concepts of the semiconductor manufacturing industry.

Assessment 1

Assessment Tool: Outcome-related exam questions

Assessment Date: Fall 2027

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: All

How the assessment will be scored: Answer key

Standard of success to be used for this assessment: 70% of students will score 70% or higher.

Who will score and analyze the data: Departmental faculty

2. Demonstrate proper procedures for working in a clean room manufacturing environment.

Assessment 1

Assessment Tool: Outcome-related demonstration

Assessment Date: Fall 2027

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: All

How the assessment will be scored: Checklist

Standard of success to be used for this assessment: 70% of students will score 70% or higher.

Who will score and analyze the data: Departmental faculty

3. Explain the purpose and operation of vacuum systems in semiconductor manufacturing.

Assessment 1

Assessment Tool: Outcome-related exam questions

Assessment Date: Fall 2027

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: All

How the assessment will be scored: Answer key and rubric

Standard of success to be used for this assessment: 70% of students will score 70% or higher.

Who will score and analyze the data: Departmental faculty

4. Describe the proper steps for performing vacuum system leak tests.

Assessment 1

Assessment Tool: Outcome-related demonstration

Assessment Date: Fall 2027

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: All

How the assessment will be scored: Checklist

Standard of success to be used for this assessment: 70% of students will score 70% or higher.

Who will score and analyze the data: Departmental faculty

Course Objectives

1. Define what a semiconductor is and explain what semiconductors are used for.
2. Identify safety hazards associated with semiconductor manufacturing.
3. Identify materials used in the semiconductor manufacturing industry.
4. Describe semiconductor devices such as diodes, transistors, and integrated circuits.
5. Explain the methods involved in manufacturing semiconductor wafers.

6. Explain International Organization for Standardization (ISO) clean room standards and contamination control protocols.
7. Demonstrate proper gowning and removal procedures.
8. Demonstrate the use of various tools wearing clean room clothing (including gloves).
9. Explain the importance of vacuum systems in semiconductor manufacturing.
10. Describe the operating principles of vacuum systems components.
11. Identify parts of the vacuum system equipment where leaks are likely to occur.
12. Describe the methods used to perform leak checks.
13. Explain the safety procedures to follow when performing leak checks.
14. Demonstrate a vacuum leak check.
15. Demonstrate repairs of leak in a vacuum system.

New Resources for Course

Course Textbooks/Resources

Textbooks
Manuals
Periodicals
Software

Equipment/Facilities

<u>Reviewer</u>	<u>Action</u>	<u>Date</u>
Faculty Preparer: <i>Zachary Goldenberg</i>	<i>Faculty Preparer</i>	<i>Oct 28, 2024</i>
Department Chair/Area Director: <i>Allan Coleman</i>	<i>Recommend Approval</i>	<i>Oct 29, 2024</i>
Dean: <i>Eva Samulski</i>	<i>Recommend Approval</i>	<i>Oct 30, 2024</i>
Curriculum Committee Chair: <i>Randy Van Wagnen</i>	<i>Recommend Approval</i>	<i>Feb 11, 2025</i>
Assessment Committee Chair: <i>Jessica Hale</i>	<i>Recommend Approval</i>	<i>Feb 13, 2025</i>
Vice President for Instruction: <i>Brandon Tucker</i>	<i>Approve</i>	<i>Feb 14, 2025</i>