



**Course Syllabus
SEMESTER
School of STEM**

<i>Course Name:</i>	Cat Machine Electronics
<i>Course & Section Number:</i>	Cat 201-XXX
<i>Meeting Day(s) & Time(s):</i>	
<i>Credits:</i>	3
<i>Contact Hours:</i>	5
<i>Text:</i>	Cat Machine Electronics
<i>Instructor's Name:</i>	
<i>Office Hours & Location:</i>	
<i>OCC Phone:</i>	
<i>OCC Email:**</i>	
<i>Additional Contact Information:</i>	

**Please use only Owens email for course communications.

Catalog description:

This course provides the background needed to diagnose and repair the sophisticated electronics and computerized circuits found on Caterpillar equipment and engines. Basic electronic concepts, component function and system operation are covered. Caterpillar's procedures are taught to identify malfunctions and to test the systems properly.

Prerequisite/Corequisites:

Cat 114 & Cat 200

Course Materials:

State the name of the text, course materials, and all required readings.

Caterpillar Books Cat 201. Cat 201 workbook, Black Pens, Computer/ laptop. CWS login (with access to the DPC site), Safety glasses (clear), Microsoft office, Google Chrome, SiS (access), tool room checkout code, ability to print, Blackboard access, paint marker, and access to the internet outside of the classroom.

What You Will Learn in the Course

Course Objectives:

Course will...

Student Learning Outcomes:

Students will:

Outcome	Where Assessed
Explain the function and test the electronic components in Cat machine electronic control systems.	Completion of labs Homework, DPC, Quizzes, and tests, and Final.
Identify how to use diagnostic codes and events to troubleshooting machine electronic control systems.	Completion of labs Homework, DPC, Quizzes, and tests, and Final.
Identify Cat ET diagnostic screens and use Cat ET to view machine systems status, perform diagnostic tests, and calibrate system components.	Safety Completion of labs Homework, DPC, Quizzes, and tests, and Final.
Identify scopemeter controls and use the scopemeter to make electrical measurements.	Completion of labs Homework, DPC, Quizzes, and tests, and Final.
Identify monitoring system components and menus and use the monitoring system to view machine systems status, perform diagnostic tests, and calibrate system components.	Completion of labs Homework, DPC, Quizzes, and tests, and Final.
Identify the components and explain the operation of Cat and CAN data links, and test data links in Cat machine electronic control systems.	Completion of labs Homework, DPC, Quizzes, and tests, and Final.
Identify the components and explain the operation of NGEA and ethernet, and service NGEA components in Cat machine electronic control systems Caterpillar.	Completion of labs Homework, DPC, Quizzes, and tests, and Final.
Demonstrate correct shop safety and maintenance.	Completion of labs.
Complete all Caterpillar required DPC courses.	Completion screen shots will be submitted to Blackboard.

Technology, Lab, and File Requirements:

Cat Machine Electronic, Black Pens, Computer/ laptop. CWS login (with access to the DPC site), Safety glasses (clear), Microsoft office, Google Chrome, SiS (access), tool room checkout code, ability to print, Blackboard access, paint marker, and access to the internet outside of the classroom

Books and labs will be posted to Blackboard.

<https://sis2.cat.com/#/>

<https://catdealer.com/dpc>
<http://catdealer.com/>
<https://www.owens.edu/>

Academic Support

Disability Services Resource Center: If you have a disability or acquire one, you may be entitled to receive reasonable accommodations intended to assure you an equal opportunity to participate in and benefit from the program. To receive more information or to register for accommodations, please contact the Disability Resource Center at 567-661-7007, email disability@owens.edu, visit <https://www.owens.edu/disability/>, or stop by College Hall 124.

Tutoring Services: Owens Community College offers academic tutoring and assistance in a variety of subjects including: accounting, computing, economics, mathematics, science, and writing. For more information go to: <https://www.owens.edu/successcenters/>.

Counseling Services: Counseling Services provides assistance to students experiencing personal, educational, interpersonal/relationship, family, social, or psychological difficulties. If you feel you may benefit from this service, please contact them at counselingservices@owens.edu. More information is at <https://www.owens.edu/counseling/>.

Campus and Community Connections: The Center for Campus and Community Connections (College Hall 123) is a walk-in office created to provide retention support through resource stability initiatives and community connections. Go here for more information: <https://www.owens.edu/connection/> or contact connections@owens.edu

Owens Library: The Owens Library offers two locations (Toledo and Findlay) as well as online resources. For more information visit <https://www.owens.edu/library/>.

Students can find more information on campus resources, student support, student life, and security at this [link](#).

General Information

Student Code of Conduct: All students are expected to follow Owens Community College's Student Code of Conduct, which includes academic honesty, encompassing plagiarism. See the Board Policy for more information.

Anti-Discrimination and Harassment & Title IX/Sexual Misconduct: All students, faculty, and staff are expected to follow Owens Community College's Anti-Discrimination and Harassment Policy and the College's Title IX Policy/Sexual Misconduct Procedures and Guidelines. The College strictly prohibits and will not tolerate harassment, discrimination, intimidation, or hostile/offensive working or learning environments.

Religious Accommodations: A student seeking an accommodation for an absence permitted under Ohio's Testing Your Faith Act must provide the instructor with a written email notice with the specific dates for an absence, and must do so not later than fourteen (14) days after the first

day of instruction. Alternative accommodations are not retroactive, and no academic penalty will be imposed for an absence under the policy*. The request for an alternative accommodation will be kept confidential. Students with questions about a religious accommodation under Ohio's Testing your Faith Act may contact the College's Office of Academic Affairs: provost@owens.edu. The policy may be found on the Owens website: [3358:11-2-63 Accommodation](#) for a Student Absence for the Observance of Religious Beliefs and Practices Policy

Document Collection: Throughout the semester, your instructors may ask for a variety of assignments including tests and/or quizzes for student learning of institutional general education competencies or program assessment. Please save all your class materials until the end of the semester.

Classroom Admittance: OCC classes shall only be attended by the officially registered OCC students or perspective students, instructor of record, guest lecturer, or substitute. Visitors are not permitted to be in the classroom and should not be invited to attend or participate in the class. See [FERPA](#) regulations for more information.

Use of AI Tools: This course requires you to complete various assignments that assess your understanding and application of the course content. You are expected to do your own work and cite any sources you use properly. You are not allowed to use any artificial intelligence (AI) tools, such as chatbots, text generators, paraphrasers, summarizers, or solvers, to complete any part of your assignments. Any attempt to use these tools will be considered academic misconduct and will be dealt with according to the Owens Community College academic integrity policy. Students are expected to complete all work independently and without the assistance of AI-generated content. If you have any questions about what constitutes acceptable use of AI tools, please consult with the instructor *before* submitting your work.

Student Responsibilities & Instructor Expectations

1. The student is responsible for all material discussed in class, handed out, seen or heard in visual/audio, or written on the board.
2. The student is responsible for all work assigned whether discussed in class or not.
3. Any missed classes, tests, or assignments must be made up by the end of the semester through agreement with the instructor. Excused absences included, sick, death, and emergency (all at the discretion of the instructor). 2 unexcused absences equal a drop in a letter grade. 2 tardies equal 1 unexcused absence.
4. The instructor, with permission of the chairman, whenever appropriate and necessary, reserves the right to amend, adjust, or deviate from the course outline and lecture topic areas to assure the students of the best possible education from the course.

Safety Glasses

Students will not be permitted to attend lab classes without the required safety glasses.

Safety

Since personal safety is a major concern of both this College and the employers, students will be expected to conduct themselves in a safe manner at all times. Students will be required to follow safety requirements pertaining to: safety glasses, clothing, labs, and work procedures. (Remember SAFETY is everyone's job!)

Suggested Minimum Tool List

A list of tools are provided for the student's consideration. The tools are NOT required for this class but will be convenient for the student to own when employed and performing the tasks taught in this class.

Instructor Expectations:

Instruction will be in lecture and lab formats. Don't message on Blackboard, but email instructors Owens' email. Responses will be sent back before 2 business days.

Excused absences included, sick, death, and emergency (all at the discretion of the instructor). 2 unexcused absences equal a drop in a letter grade. 2 tardies equal 1 unexcused absence.

How Grades are Determined and Major Assignments

The final course grade is to be computed using the following weights.

Evaluation Measure	Value	Student Learning Outcome Assessed
Lab:	60 %	
Quizzes & Tests:	15%	
Homework/ DPC:	10%	
Final:	10%	

Grading Scale

Grading Procedure:

Grades will be calculated on the following scale.

94% and Above	A
87% to Less than 93%	B
78% to Less than 86%	C
70% to Less than 77%	D
Less Than 69%	F

Tentative Class Assignments:

Week 1-3

By the end of week 3, students will be able to....

1. Identify the types, characteristics, and function of input components used on Caterpillar equipment
2. Identify the types of input signals generated by each input component
3. Identify how to test and diagnose each input component
4. Identify the types, characteristics, and uses of output devices used on Cat equipment
5. Identify the types of output signals the ECU uses to control each type of output device
6. Explain the principles of pull up voltage
7. Explain various troubleshooting and diagnostic procedures
8. Test and diagnose input and output components
9. Explain the main functions of an ECM
10. Explain how an ECM interacts with a machine or an engine
11. Explain the different types of ECMs
12. Demonstrate the ability to properly troubleshoot ECM power supplies

Week 4-5

By the end of week 5, students will be able to....

13. Identify Caterpillar ET service tool components
14. Identify the Caterpillar ET dropdown menus, toolbar icons, and function keys
15. Identify and navigate to select operations
16. Identify different monitoring systems
17. Identify the main components of each monitoring system
18. Identify the service information that can be obtained from the monitoring systems
19. Explain diagnostic and event systems and explain control system behavior
20. Set up and perform a data log

Week 6

By the end of week 6, students will be able to....

21. Explain the main functions and specifications of data links used on Caterpillar equipment
22. Explain the operation of a TCP/IP (Ethernet)
23. Properly diagnose and troubleshoot various CDL, CAN Data Link, or TCP/IP related faults

Week 7-8

By the end of week 8, students will be able to....

24. Explain the purpose and benefits of NGEA and Ethernet
25. Explain the differences between CAN and Ethernet and why Caterpillar is moving from CAN to Ethernet
26. Explain various types of network topologies and what type Caterpillar is using
27. Identify key components of the technologies and hardware, as well as their industry applications

Disclaimer: The instructor reserves the right to amend this syllabus as deemed necessary and will communicate such amendment to the students in the course. Please note that while unlikely, there is a possibility courses might need to change the delivery method due to external issues like public health concerns, weather issues, etc. If this happens, the college will communicate any changes via email and/or other communication methods.