

**You may delete this page from the document that follows after reading.**

It contains plain language about the copyright we've adopted from  
**Creative Commons.**

It also contains a link to the summary for our copyright license. This summary should be consulted if you intend to copy and redistribute this material in any medium or format, or adapt, remix, transform, or build upon this material.

[Click Here for information on the Creative Commons License we've adopted.](#)



From **Creative Commons**:

This is a human-readable summary of (and not a substitute for) the [license](#). [Disclaimer](#).

**You are free to:**

- **Share** — copy and redistribute the material in any medium or format
- **Adapt** — remix, transform, and build upon the material

The licensor cannot revoke these freedoms as long as you follow the license terms.

**Under the following terms:**

- **Attribution** — You must give [appropriate credit](#), provide a link to the license, and [indicate if changes were made](#). You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.
- **NonCommercial** — You may not use the material for [commercial purposes](#).
- **ShareAlike** — If you remix, transform, or build upon the material, you must distribute your contributions under the [same license](#) as the original.

**No additional restrictions** — You may not apply legal terms or [technological measures](#) that legally restrict others from doing anything the license permits.

## Northeast Wisconsin Technical College

### *Land Acknowledgement Statement*

The region served by NWTC **occupies the ancestral home** of the Menominee Nation, who have **persisted here** in Northeast Wisconsin from **before recorded history** to the present day. The College's Green Bay campus exists **upon lands ceded from the Menominee Tribe to the Oneida Nation**. We acknowledge this land we stand upon today as sacred, historical, and significant to the Menominee and Oneida Nations as are the **lands of all First Nations People**.

See more detail at <https://tinyurl.com/244wh3xf>

## ELECTRICITY - LINEPERSONS

Catalog #31-413-355 & Class 81850

Starts: 08/14/2023 Ends: 12/13/2023



kad

### INSTRUCTOR INFORMATION & RESPONSIBILITIES

**Instructor** Tim Schmitz  
**Office** ET104L  
**Telephone** (920) 498-6849 or through Microsoft Teams  
**Email** timothy.schmitz@nwtc.edu@nwtc.edu  
**Availability** *Before/After class, or by appointment.*

*To help you be successful, I will*

- Maintain an inclusive, safe learning environment
- Provide open and frequent communication regarding your progress in this class.
- Reply to communications within 48 business hours.
- Grade assignments regularly and provide feedback to guide you toward improvement of your coursework.
- Communicate changes due to student and instructor needs, class cancelations, or college closures in a timely manner.

### CLASS INFORMATION

**Class Schedule & Meeting Location:** This class meets in Room EE203 on the Green Bay campus as described below. Our class is delivered in an in-person format.

This class meets on the following days/times:

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
2:30-4:15		2:30-4:15				

**Course Description:** This course provides the opportunity for the learner to develop the understanding of electric power/energy, three-phase voltage generation, three-phase circuit power, transformer operation principles, transformer connections, and safety practices in high voltage applications..

**Credits:** 2

**Pre-requisites/Corequisites:** 31-413-353 Electricity - Basic

**Textbooks:** Delmar's Standard Textbook of Electricity, 7th Edition, ISBN: 13: 978-1337900348

**Supplies/Technology:**

- Access to reliable high-speed internet for completing assignments
- TI-30XIIS solar calculator (or equivalent).
- Access to a full-service computing device & browser (Google Chrome or Mozilla Firefox)
- Personal planner (printed or electronic)
- Basic school supplies: pens, pencils, highlighters, and folder or 3-ring binder

**Course Competencies:** Upon successful completion of this course, you will be able to:

1. Explain the operation of common electromagnetic devices.
2. Calculate the circuit values of voltage, current, resistance, and power, for an AC resistive circuit.
3. Describe the effects of inductance and inductive reactance on AC circuits.
4. Explain the effects of capacitance, and capacitive reactance on AC circuits.
5. Apply right angle trigonometry and the Pythagorean theorem to solve values of voltage, current, impedance, power factor and phase angles of given AC reactive circuits.
6. Calculate values of voltage, current, impedance, power, and power factor, and phase angle for resistive-inductive (R-L) series and parallel AC circuits.
7. Calculate values of voltage, current, impedance, power, phase angle, and power factor, for resistive-capacitive (R-C) series and parallel AC circuits.
8. Calculate values of voltage, current, impedance, power, phase angle and power factor, for a resistive-inductive-capacitive (R-L-C) AC circuits.
9. Analyze examples of industrial power circuits.
10. Describe the operating principles, and basic types, of direct current generators.
11. Describe the operating principles of single and three phase alternating generators.
12. Characterize the three phase systems commonly used for power distribution.
13. Explain the principles of operation, and the physical requirements of single phase transformers.
14. Explain the principles of operation of three phase transformers.
15. Distinguish between the types of, and draw the proper connections for, common instrument transformers.

**Employability Skills:** In addition to specific job-related training, NWTC has identified the following transferrable employability skills reaching beyond the context of a specific course:

1. Communicate Effectively
2. Work Cooperatively and Professionally
3. Think Critically and Creatively
4. Solve Problems Effectively
5. Value Individual Differences and Abilities
6. Demonstrate Personal Accountability
7. Demonstrate Community and Global Accountability

**Estimated number of hours required to be successful in the class, (class hours and outside hours for homework, readings, etc.)** This is a 1-credit hour class. One credit hour equals approximately 45 hours of coursework. For every one hour in-class, you are expected to spend two hours of work time outside of class. The amount of time you spend on reading, completing course assignments, and activities will differ.

**Syllabus Changes:** Instructors may make changes to the syllabus based on the timeline of the class, feedback from learners and/or logistical issues. You will be informed as soon as a change is made. A current copy of the course syllabus will be maintained by the division office.

**Grading Policy:**

The grading policy for this course is designed to reinforce desired employability and study skills that include:

- Planning each week to ensure you have adequate time to prepare coursework.
- Strengthening personal study habits by awarding points for all assignments in the learning process.
- Striving for excellence in all work you are assigned to do, not just the work you want to do.

**Due dates:** All assignments must be completed and submitted by the due date.

**Late work:** Assignments submitted after the posted due date will receive a score of (0) points.

**Extra credit:** None will be offered.

**Grading Scale:**

Points	Percentage	Grade
414 - 460	90 – 100%	A
368 - 413	80 – 89%	B
322 - 367	70 – 79%	C*
276 - 321	60 – 69%	D
Less than 276	Less than 60%	F

\*C is the minimum passing grade for this class.

# Electricity: Linesperson

31-413-355

Class	Topic	Text	Assignment
8/14 8/16	Measuring Instruments Conductors	9-1 thru 9-7 9-9 thru 9-12 9-14 10-1 thru 10-8	Review Questions: Unit 9: 6, 7, 9 Unit 10: 2, 5, 9
8/21 8/23	Batteries Magnetic Induction Circuit Analysis Review	12-1 thru 12-7 13-1 thru 13-5 Unit 14	Unit 12: 12, 13, 15 Unit 13: 2, 3 Unit 14 Review Questions 1 – 10
8/28 8/30	Trigonometry and Vector Review Alternating Current	15	Circuit Analysis Worksheet Unit 15 Review Questions: 1 – 4 & 8 – 12
9/6	Review		
9/11 9/13	<b>Quiz 1</b> Inductance in AC Circuits	Unit 16	Unit 16 Review Questions: 1 – 10
9/18 9/20	R-L Series/Parallel Circuit Analysis R-L Circuit Lab	17 18	Unit 17 Review Questions: 1 – 10 Unit 18 Review Questions: 1 – 7
9/25	Capacitors Capacitance in AC Circuits	19 20	Unit 19 Review Questions: 1, 2, 4, 5, 6, 12 Unit 20 Review Questions: 1, 2, 3, 4, 5, 6, 9
9/27	RC Series/Parallel Circuit Analysis Lab	21 22	Unit 21 Review Questions: 1 – 5 Unit 22 Review Questions: 1 – 5
10/2	RLC Series/Parallel Circuit Analysis R-L-C Parallel Circuits	23 24	Unit 23 Review Questions: 1 – 10 Unit 24 Review Questions: 1, 2, 3, 6
10/4 10/9	RLC Circuit Lab <b>Quiz 2</b>	23,24 14-24	
<b>Fall Break – No Classes</b>			
10/18 10/23	Surge and Lightning Protection Three Phase Circuits	25 26	Unit 25 Questions: 1, 2, 5, 7, 9, 11, 12 Unit 26 Review Questions: 1 – 10
10/25 10/30	Single Phase Transformers Single Phase Transformers Lab	27	Unit 27 Review Questions: 1 – 14
11/1 11/6	Three Phase Transformers Three Phase Transformers	28	Unit 28 Review Questions: 1, 2, 4, 5, 6, 7, 8 Transformer Worksheet
11/8 11/13	<b>Quiz 3</b> DC Generators/Motors	25-28 29, 30	Unit 29 Review Questions: Unit 30 Review Questions:
11/15	DC Motors Lab	30	
<b>Thanksgiving Holiday – No Class</b>			
11/27	Three Phase Circuit Analysis	31	Unit 31 Review Questions: 1 – 12
11/29 12/4	Three Phase AC Motors Single Phase AC Motors	32 33	Unit 32 Review Questions: Unit 33 Review Questions:
12/6 12/11	AC Motors Lab Single Phase Generators	34 29-34	Unit 34 Review Questions:
12/13	Review	25-34	

**Student Services to Support You:** Being in college is an exciting time to develop skills, further your career path, and build community. We want to make certain that financial, physical and mental health, or technology challenges do not get in your way! Our staff and faculty at NWTC are ready to support your needs to help keep you on track with your studies and educational goals.

We encourage you to visit [www.nwtc.edu/current-students](http://www.nwtc.edu/current-students) or click on the Student Resources button in your Course Home Page on Canvas to learn more about the resources available to you, ranging from student involvement and personal counseling to academic, financial aid, and career advising, to food pantry, housing assistance, and transportation services.

Many students use these resources and services on a daily and weekly basis. Services are included in your tuition and are free to use! To access services, please contact your instructor or academic advisor via Starfish, or by calling (920) 498-5444.

**Academic Coaching and Tutoring:** Academic Coaching and Tutoring provides an additional layer of support to ensure you achieve your academic goals. Academic Coaching is committed to serving all students as an academic resource to promote student growth and success. Students who use Academic Coaching and tutoring receive course specific help along with practical experience with study skills, organization skills, time management, and confidence. We understand that school can be challenging; let us help you reach your academic goals at [www.nwtc.edu/academiccoaching](http://www.nwtc.edu/academiccoaching)

**Technology Skills & Assistance:** Everyone comes to class with a variety of technology skills and experience. If you have questions about the technology needed to be successful in this course, reach out to me. As your instructor, I will provide an overview of needed technologies and connect you to additional resources. You can also visit the Technology Resources at <https://www.nwtc.edu/current-students> or click on the Student Resources button in your Course Home Page on Canvas for information on Canvas, printing and copying, and software or get technical assistance by calling the Student Help Desk at (920) 498-6900 or 1-866-235-5037. The Library is a great resource for learning how to navigate your classes. Visit the Library during [open hours](#) or schedule an [appointment](#).

**NWTC All College Policies:** In addition to your course policies, there are policies and procedures that apply to all students taking classes at NWTC. Please refer to the NWTC Student Handbook to raise your awareness and understanding of the College's expectations. The Handbook can be found at <https://www.nwtc.edu/current-students> or click on the Student Resources button in your Course Home Page. Policies you may want to learn about more include:

- Academic Integrity (includes Plagiarism, cheating and collusion)
- Drop from a Class or Program
- Student Academic Grievance
- **Discrimination and Harassment Prevention:** We are committed to creating a respectful environment for each member of our college community. We prohibit discrimination and harassment in our educational programs and employment. Please reach out to us if you have any questions or concerns. You will find the contact information by following these links for questions or concerns related to [discrimination or harassment](#) or specifically related to [sexual harassment](#).
- **Disability Act Statement:** NWTC is committed to creating a learning environment that meets the needs of its diverse student body. NWTC complies with all provisions of the Americans with Disabilities Act and makes reasonable accommodations upon request. If you have a disability or experiencing difficulties with accessibility, please call Disability Services at (920) 498-6904 to begin a conversation regarding the support services available to you or to request an official accommodation.

**Student Academic Calendar:** Visit the [Academic Calendar](#) for important College dates like registration, campus closings, and graduation. Add these important dates to your personal calendar.