Course Syllabus

EET 103 Electrical Studies I

Fall 2025

Northwestern Michigan College

Class Schedule:

Days	Times	Room Location
M / W (CRN 1719)	**10:15 – 12:15**	**PS-107**

Instructor Information:

Name: Keith E. Kelly
Office Location: PS-107 or virtual
Phone Number: 231.995.1312
Email: kkelly@nmc.edu

Office Hours:
Monday and Wednesday – 3:00 PM to 4:00 PM
Remote Zoom – by appointment

Course Description:
Explore the fundamentals of electricity and electronics by developing introductory analysis, construction and troubleshooting techniques for DC and AC circuits. Safe electrical practices will be emphasized throughout the course as the student constructs circuits from schematics and diagrams using proper wiring and soldering techniques. Electrical measurements will be performed using multimeters and oscilloscopes. (3 Credit Hrs. / 4 Contact Hrs.)

Prerequisite Courses / Placement:
MTH 023 which may be taken concurrently.

Teaching Methods
We will use lectures, homework, exercises, activities, and projects to understand the course content. The course is divided into five sections, called sprints, each lasting three weeks. Lecture content, demonstrations, class activities, and labs will build understanding and capabilities. At the end of each sprint, summative assessments will check for competency. These assessments will include video production in addition to standard quizzes and tests.

This is a face-to-face class with required attendance, but we will be using the Zoom video conferencing tool throughout. First, the video sharing feature will enable each of you to demonstrate and record circuit work. It will also enable each class session to be recorded. This will enable late review of activities and content as well as enable make-up if you do need to miss a class session.

Required Course Material:

- Textbook:
  - All About Circuits - DC
- Scientific Calculator Application
  - RealCalc - Android Apps on Google Play
  - Panecal Scientific Calculator on the App Store (apple.com)
- Student kit (provided in class – see session 1)
- EveryCircuit from MuseMaze(student license is provided)

Course Objectives / Learning Outcomes:

Learning outcomes for EET 103 Electrical Studies I can be summarized in three areas:

Lab Safety:

- Students will follow established best practices to safely work around electrical systems

Circuit Analysis

- Students will define electrical parameters.
- Students will describe the principles of operation for electrical systems
- Students will identify circuit type by inspecting components and configuration
- Students will calculate electrical parameters of a resistive, inductive, and/or capacitive circuit
- Students will operate electrical test equipment
- Students will construct an electrical circuit from a schematic and wiring diagram following proper techniques
- Students will evaluate an electrical circuit using common test equipment

Application

- Students will determine the appropriate use of circuits in real world applications
- Students will reflect on how technology has created changes in their life

How each learning outcome is assessed is listed in the table below.

Significant Learning Outcomes Assessment:

Area	Learning Outcome	Assessment Tool
Knowledge	Students will define electrical parameters. Students will describe the principles of operation for electrical systems Students will identify circuit type by inspecting components and configuration	Homework & Quick Tasks, Tests
Application	Students will calculate electrical parameters of a resistive, inductive, and/or capacitive circuit Students will operate electrical test equipment	Homework & Quick Tasks, Labs, Tests
Integration	Students will construct an electrical circuit from a schematic and wiring diagram following proper techniques Students will evaluate an electrical circuit using common test equipment (QR)	Labs, Tests
Human Dimension	Students will follow established best practices to safely work around electrical systems	Homework & Quick Tasks, Labs, Tests
Caring – Civic Learning	Students will reflect on how technology has created changes in their life.	Homework, presentation
Learning How to Learn	Students will determine the appropriate use of circuits in real world applications	Homework & Quick Tasks, Labs

General Education Outcomes:
Quantitative Reasoning: Students will accurately use numbers, symbols, measurements, properties, and the relationships of quantities to make sound decisions, judgments, and/or predictions

Grade Determination:
Final grades will be determined as follows: Total of all deliverables including tests, quizzes, worksheets, homework, lab scores, and tests divided by the total possible points x 100%

Grading Scale:

4.0 = 93% or above
3.5 = 85 – 92%
3.0 = 80 – 84%
2.5 = 75 – 79%
2.0 = 70 – 74%
1.5 = 65 – 69%
1.0 = 60 – 64%
0.0 = below 60%

Proposed Assignments / Grading Criteria (Tentative):

Assignment	***Total Points***
Sprint 1 production	50
Sprint 1 assessment	40
Sprint 2 production	50
Sprint 2 assessment	40
Sprint 3 production	50
Sprint 3 assessment	40
Sprint 4 production	50
Sprint 4 assessment	40
Sprint 5 production	40
Final	100
Total	***600***

Attendance/Participation

You are expected to attend each class session. Students are expected to actively participate in class by asking questions, working on in-class exercises, giving presentations as individuals or as part of their team projects, and sharing firsthand experiences and opinions related to the topics discussed. Students who do not participate in class or miss more than four in-class hours without a pre-approved excuse will have their final grades reduced by one grade (i.e. 4.0 to 3.5). Be sure to contact me BEFORE you miss a class, if possible. Extended or initial absence can result in the instructor dropping you from the course.

Let me know about last minute emergencies via email or phone as soon as you can.

Late Work

Work must be submitted by the stated deadline. There is an opportunity to make up for missed points at the end of each sprint. The instructor will discuss the concept of technical debt and the process for making up points. Test points cannot be made-up. See the course web site for descriptions of homework assignments. If you have a special circumstance, let me know in advance.

Makeup Tests and Presentation Date Changes

Requests for makeup tests or presentation date changes must be made in advance with the instructor or the student will get no credit for that item.

Honesty

I'm very aware of how easy it is to share your work when it is in electronic form. Be sure you are aware of the Student Code of Conduct found in the Student Handbook. Assisting others with assignments and coding is expected. Providing copies of your work for others to copy is cheating. If you cheat, you fail the course.

How to Get the Most Out of This Learning Experience

Below are a few simple steps that will make this learning experience even better:

- Take charge of your own learning. Raise questions, prove, explore, go after what you need
- Be open. Use your imagination, consider new possibilities, and create something new
- Give as well as receive. Give liberally to co-learners and be prepared to receive a great deal from them
- Have fun!! Plan to thoroughly enjoy this opportunity to learn and to grow in your professional competence and satisfaction
- Take advantage of all the great equipment we have in the lab and your chance to experiment.

Syllabus Changes:

- The instructor reserves the right to make changes to the syllabus and will inform the class of any changes.

College-wide Syllabus:

- Visit the college syllabus available in the Syllabus section of the Canvas course page to view college policies and learning services information.

Late Assignments and Assignment Make Up Procedure:

Late assignment protocols and make-up procedures are defined by type.

Labs:

- The expectation with labs is that they will be finished the day that they are assigned. However, if for some reason you do not finish during the class period, then you are expected to complete the lab outside of class. The only exception for this is if the instructor informs you that additional time will be given in the next class period.

Tentative Course Itinerary (subject to change):

The specific day-to-day activities, assignments and topics are located on the Canvas course page.

Week	Topic	Assignments , etc.
1	Course Overview and Electrical Fundamentals	Lab – Intro to electricity
2	Electrical Safety, Test Equipment, and Overcurrent Protection	Lab Activity – Continuity, Tools of the Trade
3	Switches, Conductor Types and Sizing, Resistors and Circuit Construction Techniques	Lab Activity – Switch Types, Resistors, Basic Circuits
4	Ohm's Law, Series Circuit Build and Analysis	Lab Activity – Series Analysis, Voltage Dividers
5	Parallel Circuit Build and Analysis	Lab Activity –Parallel Circuit Analysis

6	Series / Parallel Circuit Build, Analysis and Troubleshooting	Lab Activity – Series/ Parallel Circuits Electronics Simulation SW
7	Soldering Techniques and Applications	Lab Activity – Soldering Basics
8	Soldering – cont. / Midterm Exam	Complete labs – Soldering - Applications
9	AC Waveforms, Oscilloscopes, and Capacitors	Lab Activity – Func. Gen and Scopes, Capacitor (charge / discharge)
10	Timer Circuit Functionality, Construction and Signal Analysis, Capacitors,	Lab Activity – 555 Timers
11	Magnetism and Induction	Lab Activity – Inductors, Coils, Motors
12	Transformers and Distribution	Lab Activity – Single Phase Transformers
13	Relay Logic	Lab Activity – Relays
14	Relay Logic Applications	Lab Activity – Relays – cont.
15	Application and Integration	Lab Activity – 7 segment displays, relays
16	Review and Final Exam	Complete labs