Course Outline

1. **Course number and name**
   ENGR 459: Power Engineering Laboratory

2. **Credits and contact hours**
   1 credit hour

3. **Instructor’s or course coordinator’s name**
   Instructor: Peter Leung
   Course coordinator: Hao Jiang, Assistant Professor

4. **Text book, title, author, and year**

   a. other supplemental materials

5. **Specific course information**
   a. **brief description of the content of the course (catalog description)**
      Use advanced instrumentation to measure and monitor electrical power systems of commercial and industrial facilities. Use computers to control experiments, instrumentation, equipment, motion control applications and experiments.

   b. **prerequisites or co-requisites**
      A grade of C or better in ENGR 306

   c. **indicate whether a required, elective, or selected elective course in the program**
      Elective

6. **Specific goals for the course**
   a. **Specific outcomes of instruction.**
      - The student will demonstrate an ability to use digital instrumentation to acquire experimental data.
      - The student will demonstrate an ability to use computer to analyzer the data acquired through digital oscilloscopes.
      - The student will demonstrate an ability to use LabVIEW to generate desired waveforms, save them to a computer, and retrieve them from a computer.
      - The student will acquire the ability to use LabVIEW to control laboratory instrumentation such as a Tektronix Oscilloscope.
      - The student will demonstrate an ability to use a variable frequency drive to configure a motion control testing system using a 3-phase induction motor.

   b. **Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.**
      - Course addresses ABET Student Outcome(s): [b, k].
7. *Brief list of topics to be covered*

- Introduction of digital oscilloscope and other digital instruments
- Introduction of graphical programming language, LabVIEW
- Creating a user friendly GUI voltage and current virtual control panel
- Data acquisition using a computer
- AC power analysis in inductive and resistive circuits
- H-Bridge DC motor control using a GPIB
- H-Bridge DC motor control using a DAQ
- Observing a 3-phase variable frequency driving operation