1. **Course number and name**
   ENGR 455: Power Electronics

2. **Credits and contact hours**
   4 credit hours

3. **Instructor’s or course coordinator’s name**
   Instructor: Hao Jiang, Hao Jiang, Ph.D.
   Course coordinator: Tom Holton

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)**
      
      Power Electronics device characteristics. Important circuit component design and analysis concepts. Uncontrolled and phase controlled rectifier circuits. DC to DC Converters, Switching Power Supply. Pulse Width Modulation. AC to DC inverter. Utility interference and Harmonic issues for power electronics Circuits.

   b. **prerequisites or co-requisites**
      Grades of C or better in Engr 353 and ENGR 301 and ENGR 306

   c. **indicate whether a required, elective, or selected elective course in the program**
      Elective for Computer and electrical Engineering.

6. **Specific goals for the course**
   a. **Specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.**
      - To learn fundamentals of power electronics components and circuits analysis techniques, and design skills.
      - To acquire basic understanding of various power converter modules used to build power electronics system.
      - To acquire the ability to select and design suitable power converter modules/system in order to meet requirements of industrial applications.
      - To gain hands-on experience in designing, testing, and debugging power electronics circuits.
Course Online

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): a, b, c, k

7. *Brief list of topics to be covered*

- Basic power semiconductor switching devices
- Review of basic electrical and magnetic circuit concepts
- Line frequency AC to uncontrolled DC power converter
- Line frequency AC to controlled DC power converter
- DC-to-DC power converters.
- DC-to-AC converters.
- Circuit simulation using Pspice or equivalent to assist design of power electronics circuits
- System design and integration per specifications
- Lab: Study performance of various power converters; design, build, verify, and troubleshoot a power electronics system like Switching Mode Power Supply.