1. **Course number and name**
   EE 486: Power Electronics

2. **Credits and contact hours**
   3.0 (three lecture hours per week)

3. **Instructor's or course coordinator's name**
   Ali Mehrizi-Sani

4. **Text book, title, author, and year**
   D. W. Hart. 2011. *Power Electronics*. New York: McGraw-Hill.
   Other supplemental materials
   Lectures will be recorded using WSU's Panopto system.

5. **Specific course information**
   a. *Catalog description:* Analysis and modeling of power electronics-based converters, steady state operation
   b. *Prerequisites or co-requisites:* E E 361 with a C or better; certified major in Electrical Engineering, Computer Science, or Computer Engineering.

6. **Specific goals for the course**
   At the end of this course, students must be able to:
   - Explain the purpose and principles of operation of power electronic converters (1) (1a, 1b, 1c, 1d, 1e);
   - Analyze the voltage and current waveforms resulting from a power electronic converter (1, 2) (1d, 3e, 7a, 7b, 7c, 7d, 7e, 7f, 7g));
   - Compare and contrast different converter topologies (1, 2) (1a, 1b, 1c, 1d, 1e);
   - Analyze the steady-state operation of a power electronic converter (1, 2) (1a, 1b, 1c, 1d, 1e);
   - Design the parameters of a power electronic converter, e.g., a voltage-sourced converter (VSC) (2) (6a, 6b, 6c, 6d);
   - Derive the steady-state model of converter (1) (1a, 1b, 1c, 1d, 1e); and
   - Compare different converters (e.g., different dc-dc converters) based on the application (2) (1a, 1b, 1c, 1d, 1e).

7. **Brief list of topics to be covered**
   - Power computations and review of circuit analysis;
   - Inductor voltage-second balance (IVSB) and capacitor charge balance (CCB);
   - dc-dc converters modeling and analysis;
   - dc power supplies;
   - dc-ac converters (inverters) modeling and analysis;
   - ac-dc converters (rectifiers) modeling and analysis;
   - ac-ac converters;
   - Applications of power electronics in power systems;
   - Introduction to PERKS, an online tutor for power electronics;

- Simulation of converters.