1. **Course number and name**
   EE 261: Electrical Circuits I

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

3. **Instructor's or course coordinator's name**
   Sandip Roy

4. **Textbook, title, author, and year**
   J. W. Nilsson and S. Riedel. 2015. *Electric Circuits* (11th ed.). Pearson. ISBN-13: 978-0133760033.

5. **Specific course information**
   a. *Catalog Description:* Application of fundamental concepts of electrical science in linear circuit analysis; mathematic models of electric components and circuits.
   b. *Topic Pre-requisites:* Math 315 (or corequisite), Phys 202, corequisite in EE 262. Classical physics for scientists and engineers: electricity, magnetism, and light. Linear differential equations.
      EECS Courses Corequisites: EE 262: Electrical Circuits Laboratory
      Other Course Corequisites: Math 315, Phys 202
      Topic Corequisite: Classical Physics for scientists and engineers: electricity, magnetism, and light. Linear differential equations. Sufficient computer literacy to use programs such as PSPICE.
   c. *Required, elective, or selected elective:* Required.

6. **Specific goals for the course**
   At the completion of the course, a student will be able to
   - Understand and apply basic circuit-engineering definitions and constructs (1a-1e, 6a, 7b, 7f).
   - Create linear mathematical models of electric circuits consisting of power sources and resistors (1a-1e,6a,7b,7f).
   - Create linear mathematical models of electric circuits consisting of power sources and passive circuit elements (resistors, inductors, capacitors) (1a-1e,6a,7b,7f).
   - Create linear mathematical models of simple electric circuits consisting of power sources, passive elements, and ideal operational amplifiers (1a-1e,6a,7b,7f).
   - Perform electrical circuit analysis for arbitrary resistive circuits (1a-1e,6a,7b,7f).
   - Perform electrical circuit analysis for first- and second- order circuits with power sources, passive elements, and ideal operational amplifiers (including sinusoidal steady-state and transient analyses) (1a-1e,6a,7b,7f).
   - Design circuits to meet certain performance criteria, such as maximum power transfer (1a-1e,2a,2b,2e).

7. Brief list of topics to be covered

- Definitions and units; independent power sources; resistors and Ohm's law; Kirchoff's laws; series and parallel circuit elements and circuit reduction.
- Nodal analysis; mesh analysis; superposition; Thevenin and Norton equivalent circuits; maximum power transfer.
- Dependent power sources and operational amplifiers.
- Energy storage elements; capacitors and inductors; first-order systems; natural and step responses of first-order electric circuits.
- Complex exponentials; second-order circuits; natural and step responses of second-order circuits.
- Steady-state sinusoidal response; phasor analysis; impedance method for AC analysis.
- Sinusoidal steady state power analysis; complex power; power triangles; power factor correction.