1. *Course number and name*

**ENGR 353: Electronics**

1. *Credits and contact hours*

3 credit hours

1. *Instructor’s or course coordinator’s name*

Course coordinator: Hao Jiang, Professor

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

Behzad Razavi *Fundamentals of Microelectronics* Wiley, 2008

1. *Specific course information*
2. *brief description of the content of the course (catalog description)*

PN Diodes, BJTs, and MOSFETs. Semiconductor device basics, characteristics and models. Diode applications. Transistor biasing, basic amplifier configurations, and basic logic circuits. PSpice simulation.

1. *prerequisites or co-requisites*

Grades of C- or better in ENGR 205 (Electric Circuits) and 206 (Electric Circuits Lab)

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

Required for Electrical Engineering and Computer Engineering

1. *Specific goals for the course*
2. *Specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.*

* To study *pn* junction diodes and basic applications
* To study transistors (BJTs and FETs), as well as their applications as single-stage amplifiers and logic inverters
* To expose students to SPICE simulation of basic op–amp, diode, and transistor circuits

1. *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): 1, 2, 3, 6, 7

1. *Brief list of topics to be covered*

* Semiconductors: semiconductor doping; drift current; resistance; diffusion current.
* Diodes: Characteristics; physical operation of pn junctions; circuit analysis; models; basic applications; SPICE simulation.
* Bipolar junction transistors: Physical operation; characteristics; models; biasing; single-stage amplifier configurations; switch and logic applications; SPICE simulation.
* Field-effect transistors: Physical operation; characteristics; models; biasing; single-stage amplifier configurations; CMOS inverters and switches; SPICE simulation.