COURSE NUMBER: Ve215	**COURSE TITLE:** Introduction to Circuits
CREDIT: 4	**PREREQUISITES:** Vv156 or Vv186, Vg 101, Co-requisite Vp 240 (or Vp260)
TEXTBOOKS/REQUIRED MATERIAL: "Fundamentals of Electric Circuits" Charles K. Alexander and Matthew N. O. Sadiku	**PREPARED BY:** Dianguang Ma **DATE OF PREPARATION:** October 25, 2012 **DATE OF UC APPROVAL:** Oct. 30, 2013
INSTRUCTOR(S): Dianguang Ma	**SCIENCE/DESIGN:** n/a
CATALOG DESCRIPTION: Introduction to electronic circuits. Basic Concepts of voltage and current; Kirchhoff's voltage and current laws; Ohm's law; voltage and current sources; Thevenin and Norton equivalent circuits; DC and low frequency active circuits using operational amplifiers, diodes, and transistors; small signal analysis; energy and power. Time- and frequency-domain analysis of RLC circuits. Basic passive and active electronic filters. Laboratory experience with electrical signals and circuits.	**COURSE TOPICS:** 1. Introduction to Ve215, Basic concepts, Basic concepts (2 hrs) 2. Basic laws (2 hrs) 3. Methods of analysis (4 hrs) 4. Basic theorems (4 hrs) 5. Operational amplifiers (4 hrs) 6. Capacitors and inductors, first-order circuits (6 hrs) 7. Second-order circuits (4 hrs) 8. Sinusoids and phasors , Sinusoidal steady-state analysis (6 hrs) 9. AC power analysis (4 hrs) 10. Three-phase circuits (4 hrs) 11. Magnetically-coupled circuits (4 hrs) 12. Frequency response (4 hrs)

COURSE STRUCTURE/SCHEDULE: Lecture: two times per week, two 90 minutes; Laboratory: five, 2 hrs each

COURSE OBJECTIVES [Course Outcomes in brackets]	1. To acquaint students with the basic concepts, laws, and theorems for electric circuits. [1, 2, 4] 2. To teach students how to analyze dc circuits. [1, 2, 3, 4, 5, 6, 7] 3. To teach students how to analyze ac circuits. [1, 2, 3, 4, 5, 8, 9] 4. To introduce students to, and stimulate interest in, electrical, electronics, and computer engineering. [10] 5. To prepare students for follow-up courses of the Electrical and Computer Engineering program. [1, 2, 3, 4, 5, 6, 7, 8, 9]
COURSE OUTCOMES [Program Outcomes in brackets]	After completing Ve215, students should be able to: 1. Classify circuit elements. [a] 2. Use Ohm's law and Kirchhoff's laws to analyze simple circuits. [a, e, k] 3. Use nodal and mesh analysis methods to analyze circuits systematically. [a, e, k] 4. Use circuit transformation techniques and circuit theorems to simplify circuit analysis. [a, e, k] 5. Analyze and design operational amplifier circuits. [a, c, k] 6. Use singularity functions to represent switching operations. [a] 7. Build and solve linear constant-coefficient differential equations describing dc circuits. [a] 8. Analyze ac circuits, including single- and three- phase circuits, in the phasor domain. [a, k] 9. Analyze and design frequency-selective filters. [a, c, k] 10. Understand the principles and applications of circuits to engineering. [a, b, k]
ASSESSMENT TOOLS [Course Outcomes in brackets]	Homework [1, 2, 3, 4, 5, 6, 7, 8, 9] Hardware and software labs [1, 2, 4, 5, 8, 9] Closed-book exams [1, 2, 3, 4, 5, 6, 7, 8, 9]