Institutional Syllabus

___ New Course  ____ Date of Last Review  ___ 9/15/05 ___
___ Substantive Change in Existing Course  __ Date of Most Recent Approval ______

I. Course Title
   • Electric Circuits

II. Course Prefix/Number
   • PHYS 244

III. Credit Hours
   • 3.0

IV. Prerequisites
   • PHYS 230 Minimum Grade D; AND MATH 220 Minimum Grade D

V. Catalog Description
   • A development of the concepts used to analyze DC and AC circuits. Topics will include Kirchoff’s Voltage and Current Laws, series-parallel networks, mesh analysis, network theorems (DC and AC), and resonance circuit analysis. Mathematical techniques such as determinants and Gaussian elimination are developed as needed. This is a problem solving class and no laboratory work is associated with the class.

VI. Curricular Relationships
   • The course is designed as an introduction to electric circuit analysis. It covers much of the same material that is traditionally encountered during a second semester physics course, but it is covered at a much deeper and more complex level. It is a required course for many engineering degrees, and would be beneficial to any student needing to develop their problem solving skills.

VII. Student Learning Outcomes
   • Students will demonstrate an understanding of circuit components and their behavior.
   • Students will demonstrate an understanding of series circuits, parallel circuits, and series-parallel networks.
   • Students will be able to analyze circuits using multiple techniques such as mesh analysis, nodal analysis, and network theorems such as Thevinin’s Theorem, Norton’s Theorem, the Maximum Power Transfer Theorem, Millman’s Theorem, and other similar tools and processes.
   • Students will be able to present clear, logical, and complete solutions to problems in a manner consistent with the meticulous nature of engineering.
• Students will enhance their problem solving skills within the context of the broad discipline of engineering.

VIII. Content Outline
• Basic Laws: Ohm's Law, Kirchoff's Laws, series and parallel resistors, etc.
• Nodal analysis and mesh analysis
• Circuit Theorems: superposition, Thevenin's Theorem, Norton's Theorem, etc.
• Operational Amplifiers.
• Capacitors and inductors.
• RL, RC, and RLC circuit behavior.
• Sinusoidal signals and phasors.
• Sinusoidal steady-state analysis.
• AC Power Analysis.

IX. Course Procedures/Policies/Grading Scale
• Homework is assigned regularly with a representative group of problems being graded and weighted as a significant portion of the course grade.
• Approximately three or four examinations are given during the semester in addition to a cumulative final examination during finals week.
• The grading scale will be:
  90-100  A
  80-89   B
  70-79   C
  60-69   D
  <60    F

X. Required/Recommended Readings
• The course will use a standard engineering electric circuits textbook such as: Electric Circuits by James W. Nilsson and Susan Riedel, published by Prentice Hall Publishing.

XI. Issues Unique to this Course
• None

XII. Additional Departmental Issues
• None