Required course in Electrical Engineering

Catalog description:
(3-1) 3 hours credit. Prerequisites: PHY 1924, EE 2423, and completion of or concurrent enrollment in EE 3423 or ME 3323. Electrical properties of semiconductors; P-N junctions; diode circuits; BJTs and FETs; application to digital and analog circuits; and use of SPICE to solve simple circuits. One hour of problem solving recitation per week.

Prerequisite:
1. PHY 1924 Technical Physics II (requires a grade of C or better)
2. EE 2423 Network Theory (requires a grade of C or better)

Co-requisite:
1. EE 3423 Signals and Systems I (EE’s)
2. ME 3323 Dynamics of Mechanical Systems (ME’s)

Textbook:

References:
3. OrCAD 10.0 Demo Software. The department has a multi-user license for full OrCAD PSpice which can be run from departmental computers. If you wish to run PSpice software at home, you may download the software from Cadence at http://www.orcad.com/downloads/orcadlite10/default.asp (Warning: It is 174MB), or you can request a CD from the same site.

Major prerequisites by topic:
1. Electricity and magnetism.
2. Analysis of DC and AC circuits.
3. Frequency response and complex variables.

Course objectives: (Numbers in brackets refer to the objectives and outcomes of the EE Department)
1. Learn to model and analyze amplifier circuits. [A.1, B.2]
2. Learn to analyze and design op-amp circuits. [A.1, A.3, B.1, B.2]
3. Learn to analyze and design diode circuits. [A.1, A.3, B.1, B.2]
4. Learn to analyze and design BJT circuits. [A.1, A.3, B.1, B.2]
5. Learn to analyze and design FET circuits. [A.1, A.3, B.1, B.2]

Topics:
1. Basic amplifiers: gain, input impedance, output impedance.
2. Op-amps.
3. Diode circuits.
4. BJT circuits.
5. FET circuits.

Class/Recitation schedule:
Two 75-minute lecture sessions/week
One 50 minute recitation session/week
Contribution of course to meet the professional component:
Knowledge of engineering sciences necessary to analyze and design complex electrical and electronic devices.

Relationship to Electrical Engineering program objectives and outcomes:
This course primarily contributes to the Electrical Engineering program outcomes:
A.1/B2: Students will have an ability to utilize advanced mathematics, general scientific principles, and computer applications for solving practical engineering problems.
A.3: Students will have fundamental design skills.
B.1: Students will have an ability to identify, formulate, and solve engineering problems.
C.5: Students will have hands-on experience with modern engineering tools, software, and instrumentation relevant to their field of specialty.
This course secondarily contributes to the Electrical Engineering program outcomes:
A.2: Students will have an ability to conduct experiments, and interpret and analyze data.

Evaluation methods:
1. Two 75-minute exams
2. Weekly homework assignments
3. Final exam

Performance Criteria: (Numbers in brackets refer to evaluation methods used to assess student performance)
Objective 1
1.1 Students will demonstrate an ability to model and analyze the gain, input impedance, and output impedance of generic amplifiers. [1, 2, 3]

Objective 2
2.1 Students will demonstrate an ability to analyze and design op-amp circuits. [1, 2, 3]

Objective 3
3.1 Students will demonstrate an ability to analyze and design diode circuits. [1, 2, 3]

Objective 4
4.1 Students will demonstrate an ability to analyze and design BJT circuits. [1, 2, 3]

Objective 5
5.1 Students will demonstrate an ability to analyze and design FET circuits. [1, 2, 3]

Objective 6
6.1 Students will demonstrate an ability to use PSpice to perform complex simulations of electronic circuits. [2]

Course content:
Engineering Science  50%
Engineering Design  50%

Relationship to other courses:
This is a required lower-division course. It is a co-requisite for EE 3113.

Coordinator:
Lars K. Hansen, Senior Lecturer, Electrical Engineering

Persons who prepared this description:
This syllabi was prepared by Dr. Lars Hansen and Mr. Doroteo Chavarria and reviewed by Dr. James Frazer, August 2003

Signatures:
Part B – General Course Information and Policies

**Spring 2005:**
Instructor: Lars K. Hansen  
Office: SB 1.01.04  
Office Hours: Monday and Wednesday 1:00-1:50, Friday 12:00-12:50, or by appointment.  
Phone: 458-5938  
Email: lhansen@idworld.net  
Web page: [http://users.idworld.net/lkhansen/](http://users.idworld.net/lkhansen/)  
Lecture Room: HSS 2.01.40  
Lecture Hours: MW 4:00-5:15PM

**Grading Policy:**
1. Two 75-minute exams 25% each  
2. Weekly homework assignments 20%  
3. Final exam 30%

**Exam Schedule:**  
Exam 1 – Wednesday, March 2; Exam 2 – Wednesday, April 13.

**Missed Exams:**  
There will be no make-up exams; those with a valid excuse for missing an exam will have the exam percentage pro-rated evenly into the remaining exam (if any) and the final.

**Late Homework:**  
No homework will be accepted after the due date.

**Homework and Exam Solutions:**  
Solutions to the exams and the graded portion of the homework will be posted in PDF format to the class web page after the homework has been turned in. Follow the links from my web page to Spring 2005 classes, then EE 3313.

**Attendance:**  
Attendance at lectures is strongly encouraged but not required. However, you are responsible for assignments and material presented in class. Some lecture material may not be in the text.