King Saud University
College of Engineering
Electrical Engineering Department

EE 315
Analog and Digital Electronic Circuits

Credits: 3 (3 lectures – 0 lab)
Pre-requisite: EE 311
Instructor: Dr. Nacer Debbar **Office:** 2 C 24 / 1

Description: Amplifiers types and circuits models, circuit realization using op-amps. Negative feedback, properties and topologies. Bipolar digital circuits. MOS digital circuits.

Objectives: The course is designed to introduce the students to the analysis and the understanding of analog and digital electronic circuits used in a variety of applications.

Textbook: Microelectronic Circuits, By Sedra and Smith, 4th edition.

Course Contents:

CH 2: Operational Amplifiers
2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7

CH 5: Field Effect Transistors
5.7.4, 5.8

CH 6: Differential and Multistage Amplifiers
6.1, 6.2, 6.4, 6.5

CH 8: Feedback
8.1, 8.2, 8.3, 8.4, 8.5, 8.6

CH 13: MOS digital Circuits
.131, .132, .133, .134, .135, .136

CH 14: Bipolar digital Circuits
.141, .142, .143, .144, .14 5, .146

Course Structure:
The class meets for three lectures a week, each consisting of 50 minute sessions. There is regular homework and two midterm exams. A final project is required by the end of the instruction period.

Grading:

- Two midterm exams: 40%
- Homework: 5%
- Quizzes (Lecture and tutorial): 5%
- PSPICE projects: 5%
- Final exam: 40%

Attendance Policy:

According to KSU policy, every student should attend at least 75% of the course classes (lectures and tutorials). Those who fail to meet this condition will fail in the course!

Outcome Coverage:

a. Apply math, science and engineering

This course contains some mathematical modeling of various electronic devices and circuits.

b. An ability to design and conduct experiments, as well as to analyze and interpret data.

None

c. An ability to design a system, component, or process to meet desired needs.

Throughout the homework and final project, the students are required to design electronic circuits to meet given desired objectives. Their designs are tested through simulations or laboratory experimentation.

d. An ability to function on multi-disciplinary teams.

Students form teams of up to 3 students for the final project. The students may have different background strength, but are cooperatively working to achieve the objectives of the experiments or project. Team members naturally tend to specialize in one aspect of the experiment or project creating a multi-disciplinary environment within the team. This cooperation is also required to prepare the project reports. Each person in the group is assigned a portion of the report.

e. Identify, formulate and solve engineering problems

The class includes various examples of designing electronic circuits to meet specific requirements.

g. An ability to communicate effectively.

Students had a course on proper writing style. For design reports, each student is required to write a five to seven page report. The reports are separately graded for writing style and technical content. Writing style is typically 30% of the report grade.

The students are also required to prepare written report on their final projects. The reports are presented by the students in the class where they discuss and defend their work.

h. Broad education necessary to understand the impact of engineering solutions in a global and societal context

The impact of modern technologies on existing or new industrial process is discussed throughout the course.

i. Recognition of the need for and an ability to engage in life-long learning.

The course material contains areas where technologies are continually changing. New applications and designs of electronic circuits are continually introduced and the students understand that they must be capable to track these development. In addition, students must consult reference sources and inform themselves concerning certain aspects of the course material. This helps students realize that they need to be able to learn material on their own to acquire additional and necessary skills.

j. Knowledge of contemporary issues.

Attention is given on contemporary issues such as low power VLSI circuits. Students are engaged during the lecture time in discussing and evaluating these issues.

k. Use of modern engineering tools

The students in this course are utilizing the web to obtain supplemental source of research material. In addition, modern simulation tools are used to assist in the students designs.

Preparer: Nacer Debbar **Last revised:** october 3, 2005