Classical and Modern Astronomy

PHY 110 Section ____

Department of Physics and Astronomy

Name: **Office:**

Email: **Office Hours:**

Phone:

Class meeting time and place:

Course Description

Introductory study of fundamental electrical circuits, including dc and ac circuits, filter networks, amplifiers, diodes, transistors, and logic gates. Corequisite: PHY 110L.

Program Learning Outcomes:

This is a general education core curriculum course and no specific program learning outcomes for this major are addressed in this course.

General Education Core Curriculum Objectives/Outcomes:

- **CO1 - Critical Thinking Skills** - including creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
- **CO2 - Communication Skills** - including effective development, interpretation and expression of ideas through written, oral and visual communication
- **CO3 - Empirical and Quantitative Skills** - including the manipulation and analysis of numerical data or observable facts resulting in informed conclusions
- **CO4 - Teamwork -** including the ability to consider different points of view and to work effectively with others to support a shared purpose or goal

Student Learning Outcomes

The overall objectives of this course are that the learner will:

SLO1 - Demonstrate the ability to employ Ohm's Law and Kirchhoff's Laws to solve introductory DC and AC circuits. This objective links directly to CO 1 and CO 3.

SLO2 - Design, construct, and analyze DC and AC circuits. This objective links to CO1, CO2, CO3, and CO4.

Text and Materials

The text for this course is *Introduction to Electricity, Electronics, and Electromagnetics*, fifth edition by Robert L. Boylestad and Louis Nashelsky. PHY 110L, the Fundamentals of Electronics Laboratory, is a corequisite and the lab manual is *Experiments in Electronics Fundamentals and Electric Circuits Fundamentals*, eighth edition by David Buchla.

Course Calendar

Week	Topics	SLO
1	**Lecture and assigned readings on CO 1**	
1, 2	Chapter 2: DC Networks	1
2	Homework 1 Due – **CO 1**	1
2	**Lecture and assigned readings on CO 2**	
2, 3	Chapter 3: Series-Parallel DC Networks, Theorems, and Storage Elements	1, 2
3	Homework 2 Due – **CO 1&3**	1
4	Homework 3 Due – **CO 1&3**	2
4	**Lecture and assigned readings on CO 3**	
4	Exam 1	1, 2
5	**Lecture and assigned readings on CO 4**	
5 – 8	Chapter 4: AC Networks	1, 2
5	Homework 4 Due – **CO 1&3**	1, 2
6	Homework 5 Due – **CO 1&3**	1, 2
7	Homework 6 Due – **CO 1&3**	1, 2
8	Exam 2	1, 2
9-10	Chapter 8: Two-Terminal Electronic Devices – **CO 1&3**	1, 2
10	Homework 7 Due – **CO 1&3**	1, 2
11-12	Chapter 9: Transistors and Other Important Electronic Devices – **CO 1&3**	1, 2 1, 2
11	Homework 8 Due – **CO 1&3**	1, 2
12	Exam 3	1, 2
13-15	Selected Topics: Op-Amp Circuits, Boolean Algebra, Logic Gates, Digital Signal Processing – **CO 1&3**	1, 2 1, 2
13	Homework 9 Due – **CO 1&3**	1, 2
14	In Class Practice Test – Gates – **CO 1&3**	1, 2
15	Homework 10 Due – **CO 1&3**	1, 2
15	In Class Practice Test – Number Bases – **CO 1&3**	1, 2
16	Exam 4	1, 2

Lab Calendar

Week	Experiment(s)
1	Lab 7 – Series Circuits
2	Lab 9 – Parallel Circuits Lab 10 – Series-Parallel Combination Circuits
3	Lab 13 – The Wheatstone Bridge Lab 18 – Capacitors
4	Lab 15 – The Oscilloscope Lab 16 – Sine Wave Measurements
5	Lab 20 – Series RC Circuits Lab 21 – Parallel RC Circuits
6	Lab 24 – Series RL Circuits Lab 25 – Parallel RL Circuits
7	Lab 26 – **The Ohm's Law Project* – CO 1-4**
8	Lab 27 – Series Resonance Lab 32 – Rectifier Circuits
9	Lab 33 – Diode Limiting and Clamping Circuits
10	Lab 38 – The Common-Emitter Amplifier
11	Lab 38 – The Common-Emitter Amplifier
12	Lab Handout - Logic Gates
	Lab Exam

*This experiment is more comprehensive than the others and will count as 20% of the lab experiment grade. It is designed to allow students to demonstrate their skills in **critical thinking**, **communication**, **empirical and quantitative** analyses, and **teamwork**. Students will have two weeks to complete a formal report using word processors and spreadsheets.

The Ohm's Law Project

This project is a specially designed experiment in the co-requisite lab that will allow students to demonstrate their mastery of **critical thinking skills**, **communication skills**, **empirical and quantitative skills**, and **teamwork skills**. Ohm's Law is such an important part of electronics that I tell the class that I will use it every day in lecture. In the lab the students will set up series and parallel DC and AC circuits, including components of resistors, inductors, and capacitors. They will measure voltage drop across and current flow through a selection of circuit elements and produce graphs of voltage drop as a function of current for each circuit. The graphs should be linear and the students will measure the slopes, which are the reactance of the circuit element. Unlike other experiments performed during the semester, students will (1) design part of this experiment and will (2) be given two weeks to submit a formal, detailed write-up of the experiment. They will make use of word documents and spreadsheets to complete the project. Prior to this project students will be doing experiments in the lab as

members of teams of no less than three students and no more than five. They will have experienced **teamwork** practice for at least 1-4 weeks prior to this project. These earlier experiments will allow students to also hone their skills in **critical thinking**, **communication**, and **empirical and quantitative** analyses. **The Ohm's Law Project** will allow students to demonstrate their **critical thinking skills** through the design of a simple experiment (inquiry) to verify Ohm's law, through the collection of relevant data, and through the drawing of conclusions (evaluation and synthesis) from the results. They will do this during their regular scheduled lab time which is two hours and fifty minutes in length. The formal lab write-up associated with this project will require each student to determine his/her own results and draw his/her own conclusions (**written communications**) based on data tables and graphs (**visual communications**) produced in the exercise. Students' **empirical and quantitative skills** will be demonstrated by accuracy of measurements, manipulation and analysis of numerical data, needed calculations, error analyses and informed conclusions. This project involves an experiment where successful **teamwork** is required for students to set-up and conduct the experiment. Each team member must be willing to consider other's points of view and to work effectively with other members of the team to develop a proper experimental procedure to accomplish their goal. Data will be collected as a team. Each team member must complete the take-home part of this project independently of his/her teammates.

Course Requirements

Exams

There will be four major exams, each covering a limited amount of lecture and text material. The dates of these exams are listed in the course calendar below. The final exam will not be comprehensive. No make-up exams will be given except in the case of an excused absence. Twenty-five (25%) percent of the lab portion of the course comes from the lab exam. There are 18 graded labs, 17 of which carry equal weight and count for 55% of the lab grade. **The Ohm's Law Project** counts as 20% of the lab grade.

Homework

Ten homework assignments will be spread out during the semester. All homework should be self-sufficient, in other words, all homework should have a written statement of the problem, a drawing of the circuit to be solved, and a clear progression of work to the solution. The average of the homework grades will count as a major exam.

Grading Policy

Each major exam will be graded on a 100-point scale. The lecture and lab grades will be combined as shown below and the same grade will be recorded for both lecture and lab.

Exams	Homework	Lab
60	15	25

This means that all exams (including the final) are weighted equally, and the lecture portion of the course accounts for 75% of the total grade. The grading scale is as follows:

A 90 - 100 B 80 - 89 C 70 - 79 D 60 - 69 F < 60

Attendance Policy

Students are expected to be in class each class period. Excused absences in accordance with University policy A10 must be accompanied by documentation and delivered to the instructor within one week of the absence. Unexcused absences in excess of five will result in a lowering of the course grade by one letter.

Academic Integrity (A-9.1)

Abiding by university policy on academic integrity is a responsibility of all university faculty and students. Faculty members must promote the components of academic integrity in their instruction, and course syllabi are required to provide information about penalties for cheating and plagiarism as well as the appeal process. *(Much of this information will be provided through internet links.)*

Definition of Academic Dishonesty

Academic dishonesty includes both cheating and plagiarism. Cheating includes, but is not limited to: (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) falsification or invention of any information, including citations, on an assignment; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism include, but are not limited to: (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from the Internet or another source; and (3) incorporating the words or ideas of an author into one's paper or presentation without giving the author due credit.

Please read the complete policy and the appeals process at
http://www.sfasu.edu/policies/academic_integrity.asp and

http://www.sfasu.edu/policies/academic_appeals_students.asp

Withheld Grades Semester Grades Policy (A-54)

At the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future semesters, the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

Students with Disabilities

To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. This syllabus and other course materials can be made available in other formats. This course meets certain objectives of the ExCET/TEKS. A copy of the objectives and course correlations is available in the ExCET Advisor's office.

Students with documented disabilities that need course adaptations or accommodations please make an appointment with me as soon as possible.

F-1 Visa Holders

There are important federal regulations pertaining to distance education activity for F-1 Visa holders. All students with an F-1 Visa should follow the instructions at the following link to make sure they are in compliance.
http://www.oit.sfasu.edu/disted/facsup/f1visa.html

Acceptable Student Behavior

Classroom behavior should not interfere with the instructor's ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, Policy D-34.1).
Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the Early Alert Program. This program

provides students with recommendations for resources or other assistance that is available to help SFA students succeed.
http://www.sfasu.edu/policies/student_conduct_code.asp