Syllabus for
EE 321/PHY 321—Electronics I Lecture
3 Credit Hours
Fall 2008

I. COURSE DESCRIPTION

An introduction to the basic concepts underlying the analysis and design of circuits using diodes, transistors and Field Effect Transistors. Includes bias stability of amplifiers, design of power amplifiers and power supplies, and frequency response of active circuits.
Prerequisite: EGR 210.
Corequisite: EE 321 Lab.

II. COURSE GOALS

The University recognizes several general outcomes that arise from pursuing an education at ORU. Of these, the following three outcomes are expected as a result of taking this course:

A. Problem Solving and Analysis: This course is designed to prepare students to learn how to analyze and design basic electronic circuits using diodes and transistors.

B. Communication: Students will learn how to express their ideas coherently and effectively in written form, in examination and in research papers.

C. Global Perspectives and Citizenship: Students will recognize world-wide concerns and how they apply to the individual. They will discover the types of human behavior which creates stress on the physical environment.

III. STUDENT LEARNING OUTCOMES FOR THIS COURSE

As a result of successful completion of this course, the student will be able to do the following:

A. Explain basic operations of diode from the Shockley diode equation and circuit models.

B. Apply diodes and zener diodes in designing rectifier, power supply and voltage regulator circuits.

C. Discuss the basic operation of *npn* and *pnp* Bipolar Junction Transistors (BJT).

D. Discuss the basic operation of *n*- and *p*-channel Junction Field-Effect Transistors (JFET).

E. Discuss the basic operation of Metal-Oxide-Semiconductor Field-Effect Transistors (MOSFET) in both depletion and enhancement modes of operation.

F. Analyze transistor operation using dc and ac models.

G. Design amplifiers with stable operating-point for a given transistor.

H. Design small-signal amplifiers using BJTs and FETs.

IV. TEXTBOOKS AND OTHER LEARNING RESOURCES

Required Materials

Textbook

Robert Boylestad and Louis Nashelsky. Electronic Devices and Circuit Theory, Ninth Edition, Upper Saddle River, NJ , Prentice Hall 2006.

V. POLICIES AND PROCEDURES

A. University Policies and Procedures

1. Attendance at each class or laboratory is mandatory at Oral Roberts University. Excessive absences can reduce a student's grade or deny credit for the course.
2. Students taking a late exam because of an unauthorized absence are charged a late exam fee.
3. Students and faculty at Oral Roberts University must adhere to all laws addressing the ethical use of others' materials, whether it is in the form of print, video, multimedia, or computer software. By submitting an assignment in any form, the student gives permission for the assignment to be checked for plagiarism, either by submitting the work for electronic verification or by other means.
4. Final exams cannot be given before their scheduled times. Students need to check the final exam schedule before planning return flights or other events at the end of the semester.
5. Students are to be in compliance with University, school, and departmental policies regarding ePortfolio requirements. Students should consult the ePortfolio handbooks for requirements regarding general education and the students' majors.
   a. The penalty for not submitting electronically or for incorrectly submitting an ePortfolio artifact is a zero for that assignment.
   b. By submitting an assignment, the student gives permission for the assignment to be assessed electronically.

B. Course Policies and Procedures

1. Assessment Criterion:

Homework	15%
Project	15%
Exam 1	20%
Exam 2	20%
Final Exam	30%
Total	100%

2. Examination:
   There are three 100-point exams. Exams cannot be given before their scheduled time. Students who can not make it for an exam as required must have an authorized excuse or a convincing reason, and must inform the instructor in time. **Otherwise, no late exam will be considered.**
3. Attendance:
   Attendance at classes is mandatory and the students are expected to be punctual. It will incur one absence for every two times they are late. Three absences are allowed to accommodate emergencies and illnesses. Each absence thereafter will result in a 1% grade deduction in the final score (10% maximum). The final score will be increased by 1% for full attendance.
4. Handouts, etc
   Lecture handouts, if any, will be distributed at the beginning of the lecture. If a student misses a class, the relative information must be obtained from his/her classmates.
5. Homework and mini-project:

Homework, if any, will be assigned at the end of each lecture and will be due at the beginning of the following lecture. Late submission will result in a lower grade.

4. Academic Honesty:
   The students are strongly encouraged to work out the solutions of their homework on their own. Discussions are encouraged. Copying homework solutions from solution manual and other classmates is considered dishonest. Dishonesty in an exam, if detected, will immediately lead to a failing grade for the course and will be reported to the Dean of Arts and Sciences.
7. ePortfolio Requirements:
   None.

VVI. COURSE CALENDAR

Chapters	**Lectures**	**Topics**
	1	Introduction
1	3	Theory of semiconductors, diodes and zener diodes
2	3	Diode application: power supplies, clippers and clampers.
3	2	Bipolar Junction Transistors (BJT)
4	2	DC biasing of BJT and load line analysis
4	2	Biasing stabilization and stable amplifier design
		Examination #1
	1	Discussion of exam #1
5	1	Introduction to FET
6	3	Biasing of FET, analysis and design of CS and CD amplifiers
7	2	BJT modeling: h-parameters
8	3	Small-signal analysis and design of BJT amplifiers
9	3	Small-signal analysis and design of FET amplifiers
		Examination #1
	1	Discussion of Exam #2
10	2	Introduction to two-port-network theory: Multi-stage amplifiers
15	1	Introduction to different power amplifiers
15	3	AC-load line: Class-A and Class-B power amplifiers
15	3	Push-pull amplifiers and power supplies
	3	**Project**
		Final Examination

Course Inventory for ORU's Student Learning Outcomes

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This course contributes to the ORU student learning outcomes as indicated below:
Significant Contribution – Addresses the outcome directly and includes targeted assessment.
Moderate Contribution – Addresses the outcome directly or indirectly and includes some assessment.
Minimal Contribution – Addresses the outcome indirectly and includes little or no assessment.
No Contribution – Does not address the outcome.

The Student Learning Glossary at http://ir.oru.edu/doc/glossary.pdf defines each outcome and each of the proficiencies/capacities.

OUTCOMES & Proficiencies/Capacities	Significant Contribution	Moderate Contribution	Minimal Contribution	No Contribution
1 **Outcome #1 – Spiritually Alive** Proficiencies/Capacities				
1A Biblical knowledge				√
1B Sensitivity to the Holy Spirit				√
1C Evangelistic capability				√
1D Ethical behavior				√
2 **Outcome #2 – Intellectually Alert** Proficiencies/Capacities				
2A Critical thinking	√			
2B Information literacy			√	
2C Global & historical perspectives			√	
2D Aesthetic appreciation			√	
2E Intellectual creativity			√	
3 **Outcome #3 – Physically Disciplined** Proficiencies/Capacities				
3A Healthy lifestyle				√
3B Physically disciplined lifestyle				√
4 **Outcome #4 – Socially Adept** Proficiencies/Capacities				
4A Communication skills			√	
4B Interpersonal skills				√
4C Appreciation of cultural & linguistic differences				√
4D Responsible citizenship				√
4E Leadership capacity				√

(Revised 3/3/08)