



## **Audio Electronics Northwest College**

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### **MUSC 1323 – Audio Electronics**

CRN 89108 – Spring 2016

Spring Branch Campus | Room 209 | 9:00AM to 3:00PM | Saturday  
2 hour lecture / 4 hour lab course / 96 hours per semester / 16 weeks

**Instructor: David Wells**

#### **Instructor Contact Information:**

Cell Phone 713-417-0648

Campus Phone 713-718-5615

Email [david.wells@hccs.edu](mailto:david.wells@hccs.edu)

#### **Office location and hours**

Office Rm 440A, Spring Branch Campus, Performing Arts Center

Mon/Wed noon to 1PM, Mon/Wed 5PM to 6PM, Tues/Thurs 2PM to 2:30PM and  
5:30PM to 7PM, Sat 3 to 4PM

*Please feel free to contact me concerning any problems that you are experiencing in this course. You do not need to wait until you have received a poor grade before asking for my assistance. Your performance in my class is very important to me. I am available to hear your concerns and just to discuss course topics. While you may come by my office anytime during these hours, I move around the campus a great deal and it is best to arrange an appointment to meet with me. This may be done during class or by calling.*

#### **Course Description**

Basic concepts in electricity, Ohm's Law, circuit analysis and troubleshooting audio problems; includes soldering techniques and equipment maintenance.

#### **Prerequisites**

None

#### **Course Goal**

To provide the student with a significantly enhanced potential to be hired by a high-end studio as well as to increase their skill level as an independent recording engineer; to provide tools and knowledge which increase the earning potential of HCC graduates.

## **Student Learning Outcomes**

The student will be able to:

1. Solve circuit problems using Ohm's Law.
2. Demonstrate effective troubleshooting techniques for basic audio problems.
3. Demonstrate appropriate preventive maintenance routines in recording and sound reinforcement.
4. Utilize proper soldering techniques.

## **Learning Objectives**

Students will:

- 1.1 Describe the atomic properties involved with electricity and how this relates to conductors and insulators.
- 1.2 Demonstrate proper use of terminology associated with basic electronics such as voltage, current, and power.
- 1.3 Construct circuits using series and parallel connections.
- 1.4 Calculate voltage, current, and resistance within circuits by using Ohm's law.
- 2.1 Describe current flow and voltage drops within a DC circuit.
- 2.2 Simplify a DC circuit for analysis.
- 2.3 Define properties of AC signals such as amplitude, frequency, and phase.
- 2.4 Describe common AC signal measurement techniques.
- 2.5 Describe common passive circuit elements such as resistors, capacitors, inductors, and transformers.
- 2.6 Summarize units of measurement for passive components and coding schemes for values.
- 2.7 Explain the effect a diode has on DC and AC signals in a given circuit.
- 2.8 List common components found in power supplies and describe their operation.
- 3.1 Identify common measurement devices.
- 3.2 Demonstrate awareness of the potential dangers when using electricity and follow proper safety procedures when connecting or analyzing electronic circuits.
- 3.3 Demonstrate proper choice of components used in electronic devices based on their values and ratings.
- 3.4 Demonstrate proper use of a multimeter and oscilloscope.
- 4.1 Demonstrate proper use of soldering tools.
- 4.2 Demonstrate the ability to solder and de-solder connectors, wires, cables, printed circuit boards and components.
- 4.3 Describe the proper wiring scheme for various cable types.

## **SCANS or Core Curriculum Statement and Other Standards**

The following workplace competencies and foundation skills have been designed into this courses curriculum:

- Participate as a team member
- Works with diversity
- Selects technology
- Reading

## **16 WEEK CALENDAR**

### **WEEK ONE**

Introduction, explanations and demonstrations  
Handout #1 and Textbook  
The physics of electricity and Ohm's Law

### **WEEK TWO**

Handout #1 and Textbook  
DC principles: voltage, current, resistance and power

### **WEEK THREE**

Handout #1 and Textbook  
Resistors in series and parallel

### **WEEK FOUR**

Resistor Networks

### **WEEK FIVE**

Handout #2  
Light Emitting Diodes

### **WEEK SIX**

Handout #3 and Textbook  
Properties of Sound and Audio, Introduction to AC, the oscilloscope

### **WEEK SEVEN**

Using the oscilloscope  
Project final deadline

### **WEEK EIGHT**

Reactance, Low Pass and High Pass Filters

### **WEEK NINE**

Resonance

### **WEEK TEN**

Handout #5 and Textbook  
Introduction to Transistors

### **WEEK ELEVEN**

Common Emitter Amplifier

### **WEEK TWELVE**

Handout #6 and Textbook  
Operational Amplifiers

### **WEEK THIRTEEN**

Handout #4 and Textbook  
Power Supplies

### **WEEK FOURTEEN**

Handout #7 and Textbook  
Digital Logic

### **WEEK FIFTEEN**

Handout #8 and Textbook  
Computers  
Cables final deadline

### **WEEK SIXTEEN**

Computers

## **Instructional Methods**

MUSC 1323 is a required course for all audio recording majors.

The class will be comprised of a variety of instructional methods including lectures, class discussions, computer-based simulations, lab assignments, and hands-on demonstrations.

As a student wishing to learn about audio electronics, it is your responsibility to read the textbook and handouts, perform the software exercises, submit assignments in a timely fashion, study for exams, participate in classroom activities, and attend every class.

As an instructor, I want my students to be successful. I feel that it is my responsibility to provide you with knowledge concerning the field of electronics as it relates to the audio industry.

As I believe that engaging the students in the learning is essential for teaching to be effective, you will spend a fair amount of class time involved in collaborative activities such as labs. You will be involved in discussions with your classmates and your instructor. As you will want to contribute to these discussions, you will need to come to class prepared to discuss, analyze and evaluate information from your text and other assigned reading.

## **Student Assignments**

Assignments have been developed that will enhance your learning.

### Quizzes

Scheduled quizzes and pop quizzes may be giving at the beginning or end of class.

Appropriate time limits will be assigned for each quiz. Students must be present when a quiz begins will and NO makeup quizzes will be given.

### Circuits Challenges (software exercises)

Licensed tutorial software will be used by students to reinforce understanding of the various materials presented in lectures and reading assignments. Completion of all assigned exercises with a grade of 90% each is required. The appropriate circuit challenges should be done as the relevant topic material is covered in class.

### Lab Exercises

A variety of laboratory exercises will be performed in class to reinforce understanding of the various materials presented in lectures and reading assignments. Grading of labs is based on student participation and achieving desired outcomes. Additionally, students will construct cables outside of class time. Minimally acceptable construction quality is required for each cable or that cable will be rejected without credit until its quality meets acceptable standards. An acceptable cable will demonstrate the student's attention to detail, quality of construction and use of the proper assembly and soldering techniques.

Due to the fact that our industry requires these specific skills, **ALL FOUR ASSIGNED CABLES MUST BE TURNED IN AND JUDGED ACCEPTABLE OR A GRADE OF ZERO WILL BE ASSIGNED TO THIS CATEGORY. ALL CABLES ARE DUE NO LATER THAN THE FIFTEENTH WEEK OF CLASS**

Project

Each student will construct an electronic project from a commercially available kit. This kit must contain at least one active device (a transistor or integrated circuit) and a printed circuit board to which components are soldered. Grading is determined by the quality of construction, attention to detail, the student's ability to correctly follow assembly instructions and full functionality as intended by the designer and noted in the kit's documentation, which must be submitted with the kit when it is presented for grading. Due to the fact that our industry requires certain specific skills, **A FULLY FUNCTIONAL AND PROPERLY CONSTRUCTED KIT MUST BE TURNED IN AND JUDGED ACCEPTABLE OR A GRADE OF ZERO WILL BE ASSIGNED TO THIS CATEGORY.**

Amateur Radio Licensing

It has been shown that licensed participants in Amateur Radio (ham radio) exercise and refine more advanced electronic skills in a pathway to lifelong learning. A requirement for this course is to successfully pass the examination for the Technician class (entry level) Amateur Radio license, granted by the Federal Communications Commission of the United States government. Students already licensed will satisfy this requirement by upgrading to the next higher class of license. Examinations will be administered by a credentialed team of three Volunteer Examiners as required by law. Extra credit will be given to those who upgrade to a higher class of license than this section requires. Links to study materials are provided on my learning web.

Any assignment not turned in by the due date is subject to reduction in grade or may not be accepted.

**Assessments and Grading Percentages**

Quizzes	30% of your final grade
Circuits Challenges	10% of your final grade
Lab Exercises and cables	30% of your final grade
Project	20% of your final grade
Amateur Radio Licensing	10% of your final grade

**Instructor Requirements**

As your Instructor, it is my responsibility to:

- Provide the grading scale and detailed grading formula explaining how student grades are to be derived
- Facilitate an effective learning environment through class activities, discussions, and lectures
- Description of any special projects or assignments
- Inform students of policies such as attendance, withdrawal, tardiness and make up
- Provide the course outline and class calendar which will include a description of any special projects or assignments
- Arrange to meet with individual students before and after class as required

Communication between the instructor and students will additionally utilize the students' HCC email account. Students are unconditionally required to verify that their HCC email account is accessible and to check their email on a regular basis. Information and assignments will occasionally be communicated via email. Failure to check email will not be accepted as an excuse for any student to be unaware of course information, assignments or requirements.

Cell phones and all other electronic devices shall either be surrendered to the instructor to be placed in holding until the class is over or shall be turned off. Violators who will not comply with this policy as well as those who are disruptive in any other way are required to leave for the duration of that class. Repeated disruption will result in the student being dropped from the course.

To be successful in this class, it is the student's responsibility to:

- Attend class regularly. Students with absences in excess of 12.5% will be dropped as per college policy.
- Arrive on time and attend the entire class. All time missed due to tardiness or leaving early will count toward the 12.5% absence limit.
- If arriving after the roll is called, it is the student's responsibility to assure the professor marks them present during that session. No corrections will be made to the roll after a class session has ended.
- Participate in class discussions and activities
- Read and comprehend the textbook and handouts
- Complete all required assignments
- Ask for help when there is a question or problem
- Keep copies of all paperwork, including this syllabus, handouts and all assignments

### **HCC Course Withdrawal Policy**

If you feel that you cannot complete this course, you will need to withdraw from the course prior to the withdrawal deadline. Before you withdraw from your course, please take the time to meet with the instructor to discuss why you feel it is necessary to do so. The instructor may be able to provide you with suggestions that would enable you to complete the course. Your success is very important. Beginning in fall 2007, the Texas Legislature passed a law limiting first time entering freshmen to no more than **SIX** total course withdrawals **throughout** their educational career in obtaining a certificate and/or degree. Financial Aide will be limited at three withdrawals or failed courses.

To help students avoid having to drop/withdraw from any class, HCC has instituted an Early Alert process by which your professor *may* "alert" you and HCC counselors that you might fail a class because of excessive absences and/or poor academic performance. It is your responsibility to visit with your professor or a counselor to learn about what, if any, HCC interventions might be available to assist you – online tutoring, child care, financial aid, job placement, etc. – to stay in class and improve your academic performance.

If you plan on withdrawing from your class, you **MUST** contact a HCC counselor or your professor prior to withdrawing (dropping) the class for approval and this must be done **PRIOR** to the withdrawal deadline to receive a “W” on your transcript. \*\*Final withdrawal deadlines vary each semester and/or depending on class length, please visit the online registration calendars, HCC schedule of classes and catalog, any HCC Registration Office, or any HCC counselor to determine class withdrawal deadlines. ***Remember to allow a minimum 24-hour response time when communicating via email and/or telephone with a professor and/or counselor. Do not submit a request to discuss withdrawal options less than a day before the deadline.*** If you do not withdraw before the deadline, you will receive the grade that you make in the class as your final grade.

The deadline to drop a class in the 16-week semester is 4:30PM on April 5, 2016.

### Program/Discipline Requirements

None for this course.

### HCC Grading Scale

A = 100 – 90	4 points per semester hour
B = 89 – 80	3 points per semester hour
C = 79 – 70	2 points per semester hour
D = 69 – 60	1 point per semester hour
59 and below = F	0 points per semester hour
IP (In Progress)	0 points per semester hour
W(Withdrawn)	0 points per semester hour
I (Incomplete)	0 points per semester hour
AUD (Audit)	0 points per semester hour

IP (In Progress) is given only in certain developmental courses. The student must re-enroll to receive credit. COM (Completed) is given in non-credit and continuing education courses. To compute grade point average (GPA), divide the total grade points by the total number of semester hours attempted. The grades “IP,” “COM” and “I” do not affect GPA.

### Grading Criteria

Your instructor will conduct quizzes, exams, and assessments that you can use to determine how successful you are at achieving the course learning outcomes (mastery of course content and skills) outlined in the syllabus. If you find you are not mastering the material and skills, you are encouraged to reflect on how you study and prepare for each class. Your instructor welcomes a dialogue on what you discover and may be able to assist you in finding resources on campus that will improve your performance.

### Grading Percentages

See “Assessments and Grading Percentages” above.

### Instructional Materials

*Understanding Basic Electronics*, Second Edition, by Banzhaf, published by ARRL  
*Basic Circuits Challenge*, simulation software by ETCAI, available on my learning web  
*DC Circuits Challenge*, simulation software by ETCAI, available on my learning web  
*AC Circuits Challenge*, simulation software by ETCAI, available on my learning web  
Numerous handouts available on the professor's learning web  
(<http://learning.hccs.edu/faculty/david.wells>. A password is required to access many of the materials. It will be distributed during class.)

### EGLS3: Evaluation for Greater Learning Student Survey System

At Houston Community College, professors believe that thoughtful student feedback is necessary to improve teaching and learning. During a designated time, you will be asked to answer a short online survey of research-based questions related to instruction. The **anonymous** results of the survey will be made available to your professors and division chairs for continual improvement of instruction. Look for the survey as part of the Houston Community College Student System online near the end of the term. **For the Regular Term 16 week classes, the EGLS3 is generally available in weeks 13, 14, and 15.**

All students in this course are **required** to complete the survey and print the acknowledgement receipt at the end. The receipt is to be turned in to the instructor prior to final exam week and will be counted as a quiz grade. The score will be 100 for completion and 0 if not completed and submitted.

### HCC Policy Statements

Access Student Services Policies on their Web site:  
<http://central.hccs.edu/students/student-handbook/>

### Academic Honesty

A student who is academically dishonest is, by definition, not showing that the coursework has been learned, and that student is claiming an advantage not available to other students. The instructor is responsible for measuring each student's individual achievements and also for ensuring that all students compete on a level playing field. Thus, in our system, the instructor has teaching, grading, and enforcement roles. You are expected to be familiar with the college's policy on Academic Honesty. What that means is: If you are charged with an offense, pleading ignorance of the rules will not help you. Students are responsible for conducting themselves with honor and integrity in fulfilling course requirements. Penalties and/or disciplinary proceedings may be initiated by college system officials against a student accused of scholastic dishonesty. "Scholastic dishonesty" includes, but is not limited to, cheating on a test, plagiarism, and collusion.

- Copying from another students' test paper
- Using materials not authorized by the person giving the test
- Collaborating with another student during a test, with or without their knowledge, without express authorization from the professor



Knowingly using, buying, selling, stealing, transporting, or soliciting, in whole or in part, the contents of any quiz or test  
Bribing another person to obtain a copy of any quiz or test  
Using work performed by another as your own

Plagiarism means the appropriation of another's work and the unacknowledged incorporation of that work in one's own written work offered for credit.

Collusion means the unauthorized collaboration with another person in preparing written work offered for credit. Possible punishment for academic dishonesty may include a grade of zero or F in the particular assignment, failure in the course, and/or recommendation for probation or dismissal from the College System. (See the Student Handbook)

### **ADA - Services to Students with Disabilities**

Any student with a documented disability (e.g. physical, learning, psychiatric, vision, hearing, etc.) who needs to arrange reasonable accommodations must contact the Disability Services Office at the respective college at the beginning of each semester. Faculty are only authorized to provide only the accommodations requested by the Disability Support Services Office.

Northwest ADA Counselors: Lisa Parkinson–713.718.5422  
(officed at Spring Branch)

Dr. LaRonda Ashford–713.718.5409  
(officed at Katy)

### **Access DE Policies on their Web site:**

*All students are responsible for reading and understanding the DE Student Handbook, which contains policies, information about conduct, and other important information. For the DE Student Handbook click on the link below or go to the DE page on the HCC website.*

The **Distance Education Student Handbook** contains policies and procedures unique to the DE student. Students should have reviewed the handbook as part of the mandatory orientation. It is the student's responsibility to be familiar with the handbook's contents. The handbook contains valuable information, answers, and resources, such as DE contacts, policies and procedures (how to drop, attendance requirements, etc.), student services (ADA, financial aid, degree planning, etc.), course information, testing procedures, technical support, and academic calendars. Refer to the DE Student Handbook by visiting this link:

<http://de.hccs.edu/media/houston-community-college/distance-education/student-services/DE-Student-Handbook.pdf>

### **Access CE Policies on their Web site:**

<http://www.hccs.edu/continuing-education/>

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TITLE IX OF THE EDUCATION AMENDMENTS OF 1972, 20 U.S.C. A§ 1681 ET. SEQ.

Title IX of the Education Amendments of 1972 requires that institutions have policies and procedures that protect students' rights with regard to sex/gender discrimination. Information regarding these rights are on the HCC website under Students-Anti-discrimination. Students who are pregnant and require accommodations should contact any of the ADA Counselors for assistance.

It is important that every student understands and conforms to respectful behavior while at HCC. Sexual misconduct is not condoned and will be addressed promptly. Know your rights and how to avoid these difficult situations.

Log in to: [www.edurisksolutions.org](http://www.edurisksolutions.org) . Sign in using your HCC student e-mail account, then go to the button at the top right that says **Login** and enter your student number.

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