

Course Syllabus

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DC Electric Systems – ELT 111

3.0 Credits

Fall 2021 Semester Syllabus

Course Information

Instructor: Jeff Dufriend

Office: *Room 110 Building D

Office Hours: 12:00PM – 1:00PM Tuesday - Friday

Office Telephone: 928-649-5469

E-mail: jefferson.dufriend@yc.edu *(Please use your Yavapai student email for correspondence.)*

Course Description

Class meets in building D room 112 Electrical Lab at Yavapai College, Verde Valley Campus, Clarkdale, AZ.

Meeting times:

Monday Online

Tuesday 1:30PM–4:00PM

Credits Hours: 3 credit hours (3 lecture, 2 lab)

Utilize the principles of direct current (DC) electricity and electronic test equipment to analyze, troubleshoot and repair DC electrical circuits.

Required Text

- You are not required to purchase a text book for this course but there may be required reading from various sources that I will make available to you. It is recommended that you purchase a 3 ring binder to collect valuable handouts that can be used for future reference. It is recommended

that you purchase *Basic Electronics*, Bernard Grob (any edition).

Course Requirements

- During labs you will be required to wear the assigned PPE and follow all safety rules. There will be no exceptions! Closed toe shoes, are required to be worn in the classroom at all times. There will be no food in the classroom or labs unless it is part of a planned event and approved by instructor. Drinks are allowed only in spill proof containers. Cell phones not allowed out in class unless specifically asked to take them out for course relevant research. Please turn off ringers while in class.

Course Content & Learning Outcomes

1. Characteristics of direct-current electricity
2. Laws of direct current circuits
3. Electrical measuring instruments and safety
4. DC power sources
5. Series, parallel and series-parallel circuits
6. Magnetism and electromagnetism
7. Electrical soldering skills

Learning Outcomes:

1. Identify the basic principles of direct current electricity: voltage, current, resistance and power. (1)
2. Analyze DC circuits utilizing Ohm's/Watt's Laws to solve for resistance, current, voltage and power. (2)
3. Use safe electrical practices for electronic test equipment to measure voltage, current and resistance. (3)
4. Describe the operation and maintenance of DC power sources. (4)
5. Troubleshoot series, parallel, and series-parallel DC circuits. (5)
6. Describe magnetism and electromagnetism including the principles of generating direct current and DC motor operation. (6)
7. Utilize soldering skills to install and remove electrical components including safe practices for ESD (electro-static discharge) sensitive parts. (7)systems. (4)

Course Calendar Fall 2021

Week 1 8/16

Introduction and Syllabus

Unit 1: Intro to Electrical and Electronics Technology

- Electrical and electronics fields and industries
- Electrical and electronics programs at YC
- Lab/safety guidelines

Associated Learning Outcomes: 1

- TAKE Syllabus Quiz Due 8/20 (THIS IS YOUR FIRST ASSIGNMENT-- failure to complete this by 8/20 will result in a withdraw)
- Unit power point lecture, ISCET ESA-1 module on Electricity and Safety and ISCET ESA-2 module on Troubleshooting & Measurements.
- COMPLETE Unit 1 Worksheet: Lab and Safety Guidelines
- TAKE Unit 1 exam (50 points possible)

Week 2 8/23

Unit 2: Atomic Theory and Math

- Atomic particles
- Laws of attraction/repulsion
- Directed drift

Associated Learning Outcomes: 1

- Unit powerpoint and ESA-1 modules on Metric and Scientific Notation, Atoms and Electrons, and The Electrical Charge.
- COMPLETE Unit 2 Worksheet: Atomic Theory
- PERFORM Lab 2-1: Introduction to the lab trainers
- TAKE Unit 2 exam (50 points possible)

Week 3 8/30

Unit 3: Voltage and Current

- Voltage and current defined
- Relationship between voltage and current
- Voltage and current units

Associated Learning Outcomes: 1,2

- Unit powerpoint and ESA-1 modules on Electrical Units, Voltage and Current.
- COMPLETE Unit 3 Worksheet: Voltage and Current
- PERFORM Lab 3-1: Using a DMM
- TAKE Unit 3 exam (50 points possible)

Week 4 9/6

Unit 4: Electrical Measurements

- Type of meters
- How to safely measure V, I, and R with a DMM

Associated Learning Outcomes: 1,2

- Unit powerpoint and ESA-1 modules on Electrical Components and Measurements, Electrical Units, and Basic Circuit Measurements.
- COMPLETE Unit 4 Worksheet: Electrical Measurements
- PERFORM Lab 4-1: Measuring voltage and current
- TAKE Unit 4 exam (50 points possible)

Week 5 9/13

Unit 5: Resistance and Power

- Resistance and power units
- Relationship between R and P
- Resistor color code and measurements

Associated Learning Outcomes: 1,2

- Unit power point and ESA-1 modules on Electrical Units, Resistance and Ohm's Law, Energy and Power
- COMPLETE Unit 5 Worksheet: Resistance and Power
- PERFORM Lab 5-1: Measuring resistance
- PERFORM Lab 5-2: The potentiometer
- TAKE Unit 5 exam (50 points possible)

Week 6 9/20

Unit 6: Ohm's Law

- Relationship between V, I, and R
- Ohm's Law calculations

Associated Learning Outcome: 2

- Unit powerpoint and ESA-1 module on Ohm's Law, Energy and Power.
- COMPLETE Unit 6 Worksheet: Ohm's Law
- PERFORM Lab 6-1: Ohm's Law
- TAKE Unit 6 exam (50 possible points)

Week 7 9/27

Unit 7: Series DC Circuits

- Concepts

- Calculations
- Troubleshooting Associated

Learning Outcomes: 2,3

- Unit power point and ESA-1 modules on The Electric Circuit, Series Circuits and Troubleshooting [slides 1-9 and 12-17 ONLY].
- COMPLETE Unit 7 Worksheet: Series DC Circuits
- PERFORM Lab 7-1: Series DC Circuits
- TAKE Unit 7 exam (50 points possible)

Week 8 10/4

Unit 8: Parallel DC Circuits

- Concepts
- Calculations
- Troubleshooting

Associated Learning Outcomes: 2,3

- Unit power point and ESA-1 modules on Series Circuits and Troubleshooting [slides 10-11 ONLY].
- COMPLETE Unit 8 Worksheet: Parallel DC Circuits
- PERFORM Lab 8-1: Parallel DC Circuits
- TAKE Unit 8 exam (50 points possible)

Week 9 10/11

Unit 9: Series-Parallel DC Circuits

- Concepts
- Calculations

➤ Troubleshooting

Associated Learning Outcomes: 2,3

- Unit power point and ESA-1 modules on Series-Parallel Circuits, and Troubleshooting [slides17-21 ONLY].
- COMPLETE Unit 9 Worksheet: Series-Parallel DC Circuits
- PERFORM Lab 9-1: Series-Parallel DC Circuits
- TAKE Unit 9 exam (50 points possible)

Week 10 10/18

Unit 10: Electromagnetism

- Magnetism and electromagnetism
- Electromagnetic devices
- DC motors

Associated Learning Outcomes: 4,5

- Unit power point and ESA-2 modules on Electromagnetism, and Magnetic Devices.
- COMPLETE Unit 10 Worksheet: Electromagnetism
- PERFORM Lab 10-1: Safety-pin motor
- PERFORM Lab 10-2: Relays
- TAKE Unit 10 exam (50 points possible)

Week 11 10/25

- To be determined

Week 12 11/1

- To be determined

Week 13 11/8

- To be determined

Week 14 11/15

- To be determined

Week 15 11/22

Guest Speaker and Q&A

Week 16 12/29

Lab prep and lab final

Week 17 12/6

Final exam prep

Final exam on 12/7

Grading Policy

Methods of Evaluation

Worksheets: 280 points possible (14 @ 20 points each)

Unit exams: 700 points possible (14 @ 50 points possible each; percentage score equals number correct divided by total possible)

Lab experiments: 300 points possible (15 @ 20 points each)

Lab Final: 100 points possible (10 stations at 10 points each)

Final exam: 100 points possible (percentage score equals number correct divided by total possible)

Weighted to 10% of final grade

Total points possible without final: 1380 (90% of final grade) A = 1242-1380 points (90%) B = 1104-1241 points (80%) C = 966-1103 points (70%) D = 828-965 points (60%) F = 827 or less

Makeup Exam Policy

Please see additional instructor information at the end of this syllabus.

Grading Timeframes

I will return graded assignments within 14 days after the scheduled due date. If you have questions regarding an assignment, contact me prior to the due date so your question can be answered in a timely manner.

A course completed with a grade of D, F or U does not fulfill the prerequisite requirement for another course and may not be applied to a degree or certificate requirement.

Institutional Policies and Instructor Procedures

Student Email: Yavapai College provides enrolled students with an official username@scholar.yc.edu are expected to check their Yavapai College email account as directed by their instructor

Attendance: Students are expected to attend and participate in all class meetings, laboratories, and instructor's and College's attendance and participation requirements should be dropped/record. The last date of attendance will need to be documented.

A student-initiated withdrawal deadline is established by the College. If a student has not from the class after the deadline depending upon the instructor's withdrawal policy. If a s

Course Withdrawal: Faculty initiated withdrawals for non-attendance are in place for both the benefit of the c will withdraw them from their classes unless they have been in contact with faculty mem

Academic Calendar: <https://www.yc.edu/v6/registrar/calendar.html> (<https://nam02.data=04%7C01%7CAngie.Poland%40yc.edu%7C8c5c6234c7684aba512b08d913df842e%7Ct%3D%7C1000&sdata=0f91b1gWMzFOo3yPPreuWUQ%2BkSLnclc%2BLArFHm5E%2Fds%3E>)

Academic Integrity: Honesty in academic work is a central element of the learning environment. It is expected plagiarism, or other dishonest means are violations of the College's Student Code of Co

Definitions of plagiarism, cheating, and violation of copyright and penalties for violation a

All students need to be aware of and comply with the safety and operational protocols for </v6/college-police/covid-19/reentry/>.

Student Code of Conduct: Respect for the rights of others and for the College and its property are fundamental expectations and allegations of student misconduct.

Students are expected to respond and write in a respectful, professional, and appropriate manner. Inappropriate language or objectionable material will not be tolerated and could result in

Civil Dialogue Regardless of venue or delivery method, faculty must ensure and maintain an environment appropriate for higher education. To

Statement:

promote a positive educational experience, appropriate and civil communication is an expectation of all students. All communication must remain respectful. Language or behavior that is threatening, intimidating, harassing, defamatory, libelous, or obscene is unacceptable. Hate speech is prohibited. Failure to abide by these standards may result in disciplinary measures. Please see [policy 10.10](https://www.yc.edu/v6/policies/docs/1000d/1010-public-access-expression.pdf) [_\(https://www.yc.edu/v6/policies/docs/1000d/1010-public-access-expression.pdf\)_](https://www.yc.edu/v6/policies/docs/1000d/1010-public-access-expression.pdf) for further detail.

Academic Complaint Form:

A student may appeal an academic or instructional decision by faculty if s/he deems the decision to be made in error. The appeal must be made in a timely manner in accordance with established procedures. (www.yc.edu/academiccomplaints [_\(http://www.yc.edu/academiccomplaints\)_](http://www.yc.edu/academiccomplaints))

Acceptable Use:

Yavapai College technological equipment and resources must be used in accordance with the [Technology Resource Standards \(5.27\)](https://www.yc.edu/v6/policies/docs/500b/527techstandards.pdf) [_\(https://www.yc.edu/v6/policies/docs/500b/527techstandards.pdf\)_](https://www.yc.edu/v6/policies/docs/500b/527techstandards.pdf), [Copyright Use \(2.28\)](https://www.yc.edu/v6/policies/docs/200hr/228-copyrightuse.pdf) [_\(https://www.yc.edu/v6/policies/docs/200hr/228-copyrightuse.pdf\)_](https://www.yc.edu/v6/policies/docs/200hr/228-copyrightuse.pdf) and [Peer-to-Peer \(P2P\) File Sharing \(5.26\)](https://www.yc.edu/v6/policies/docs/500b/526-p2p.pdf) [_\(https://www.yc.edu/v6/policies/docs/500b/526-p2p.pdf\)_](https://www.yc.edu/v6/policies/docs/500b/526-p2p.pdf) policies. Use of Yavapai College equipment and resources to illegally copy, download, access, print, or store copyrighted material or download pornographic material is strictly prohibited. For example, file swapping of copyrighted material, such as music or movies is strictly prohibited. Users found to violate this policy will have their privileges to use Yavapai College technological equipment and resources revoked. (www.yc.edu/policies [_\(http://www.yc.edu/policies\)_](http://www.yc.edu/policies))

Mobile Devices:

Yavapai College is committed to providing a quality learning environment. All cell phones and mobile devices must be placed in silent mode while in classrooms, computer labs, library, learning center, and testing areas. Cell phones must be used outside these facilities.

Smoking and Tobacco Use:

Yavapai College is committed to limiting exposure to the harmful effects of primary and secondary smoke to campus students, visitors, and employees. In order to reduce the harmful effects of

tobacco use and to maintain a healthful working and learning environment, the College prohibits smoking, including vaping, on all campuses except in designated smoking areas as per the [Smoking & Tobacco Use Policy \(10.09\)](https://www.yc.edu/v6/policies/docs/1000d/1009-smoking.pdf). [_ \(https://www.yc.edu/v6/policies/docs/1000d/1009-smoking.pdf\)](https://www.yc.edu/v6/policies/docs/1000d/1009-smoking.pdf)

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**Drug Free
Environment:**

Yavapai College's policy is to provide an environment free of drugs and alcohol. The use of illegal drugs and abuse of alcohol pose significant threats to health and can be detrimental to the physical, psychological, and social well-being of the user and the entire Yavapai College community, and is prohibited. Campus Safety will be notified if a student exhibits an impaired state in the classroom environment.

**Title IX –
Sexual Misconduct:**

Yavapai College does not deny or limit any student or employee the ability to participate in or benefit from any program offered by the institution on the basis of sex or gender. Sexual harassment, which includes acts of sexual violence such as rape, sexual assault, sexual battery, sexual coercion, unwanted touching, dating/relationship violence and stalking, are forms of gender-based discrimination prohibited by Title IX.

The college encourages students and employees to report incidents of sexual misconduct as soon as possible to the Title IX Coordinator or to a Deputy Title IX Coordinator. Contact information for Coordinators can be found at [Sexual Misconduct Resources](https://www.yc.edu/v6/student-services/sexualmisconduct.html) [_ \(https://www.yc.edu/v6/student-services/sexualmisconduct.html\)](https://www.yc.edu/v6/student-services/sexualmisconduct.html) .

**Disability
Resources:**

Disability Resources ensures qualified students with disabilities equal access and reasonable accommodations in all Yavapai College academic programs and activities. YC supports disability and accessibility awareness and promotes a welcoming environment to all. The Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act of 1973 prohibits discrimination on the basis of disability and requires Yavapai College to make reasonable accommodations for those otherwise qualified individuals with a disability who request accommodations.

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Yavapai College is committed to providing educational support services to students with documented disabilities. Accommodations for a student must be arranged by the student through Disability Resources by phone 928.776.2085 or email disabilityresources@yc.edu (<mailto:disabilityresources@yc.edu>).

Faculty Response

I will do my best to respond to emails, voicemails within 48 hours during the week.

Time:

Additional Instructor Information:

LATE WORK: Assigned work (worksheets, labs, and exams) will be accepted after the due date defined in the calendar only if prior notice is given of an absence to the instructor in advance of the class meeting (via e-mail or phone). In other words, if you miss class and don't let me know about it in advance you will not be allowed to make up any work that you missed.

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Additional

Instructor

Information:













Note: All assignments including labs and worksheets are due the next class meeting.

Course Summary:


Date











Details






Due




Date	Details	Due
Wed Sep 9, 2020	 Lab 3-1 (https://canvas.yc.edu/courses/31031/assignments/538919)	due by 11:59pm
Wed Sep 16, 2020	 Unit 4 Worksheet: Electrical Measurements (https://canvas.yc.edu/courses/31031/assignments/538907)	due by 10am
	 Lab 4-1 (https://canvas.yc.edu/courses/31031/assignments/538920)	due by 11:59pm
	 Unit 5 exam (https://canvas.yc.edu/courses/31031/assignments/538886)	due by 10am
Wed Sep 23, 2020	 Unit 5 Worksheet: Resistance and Power (https://canvas.yc.edu/courses/31031/assignments/538909)	due by 10am
	 Lab 5-1 (https://canvas.yc.edu/courses/31031/assignments/538921)	due by 11:59pm
	 Lab 5-2 (https://canvas.yc.edu/courses/31031/assignments/538922)	due by 11:59pm
	 Unit 6 exam (https://canvas.yc.edu/courses/31031/assignments/538894)	due by 10am
Wed Sep 30, 2020	 Unit 6 Worksheet: Ohm's Law (https://canvas.yc.edu/courses/31031/assignments/538896)	due by 10am
	 Lab 6-1 (https://canvas.yc.edu/courses/31031/assignments/538923)	due by 11:59pm
	 Unit 7 exam (https://canvas.yc.edu/courses/31031/assignments/538888)	due by 10am
Wed Oct 7, 2020	 Unit 7 Worksheet: Series DC Circuits (https://canvas.yc.edu)	due by 10am

Date	Details	Due
	/courses/31031/assignments/538887	
	 Lab 7-1 (https://canvas.yc.edu/courses/31031/assignments/538924)	due by 11:59pm
	 Unit 8 exam (https://canvas.yc.edu/courses/31031/assignments/538911)	due by 10am
Wed Oct 14, 2020	 Unit 8 Worksheet: Parallel DC Circuits (https://canvas.yc.edu/courses/31031/assignments/538891)	due by 10am
	 Lab 8-1 (https://canvas.yc.edu/courses/31031/assignments/538925)	due by 11:59pm
	 Unit 9 exam (https://canvas.yc.edu/courses/31031/assignments/538900)	due by 10am
Wed Oct 21, 2020	 Unit 9 Worksheet: Series-Parallel DC Circuits (https://canvas.yc.edu/courses/31031/assignments/538902)	due by 10am
	 Lab 9-1 (https://canvas.yc.edu/courses/31031/assignments/538926)	due by 11:59pm
	 Unit 10 exam (https://canvas.yc.edu/courses/31031/assignments/538884)	due by 10am
Wed Oct 28, 2020	 Unit 10 Worksheet: Magnetism and Electromagnetism (https://canvas.yc.edu/courses/31031/assignments/538906)	due by 10am
	 Lab 10-1 (https://canvas.yc.edu/courses/31031/assignments/538912)	due by 11:59pm

Date	Details	Due
Wed Nov 4, 2020	 Lab 10-2 (https://canvas.yc.edu/courses/31031/assignments/538913)	due by 11:59pm
	 Unit 11 Exam (https://canvas.yc.edu/courses/31031/assignments/538883)	due by 10am
	 Unit 11 Worksheet: Alternating Current (https://canvas.yc.edu/courses/31031/assignments/538904)	due by 10am
	 Lab 11-1 (https://canvas.yc.edu/courses/31031/assignments/538914)	due by 11:59pm
Wed Nov 18, 2020	 Unit 12 Exam (https://canvas.yc.edu/courses/31031/assignments/538898)	due by 10am
	 Unit 12 Worksheet: Transformers (https://canvas.yc.edu/courses/31031/assignments/538881)	due by 10am
	 Lab 12-1 (https://canvas.yc.edu/courses/31031/assignments/538915)	due by 11:59pm
Wed Dec 2, 2020	 Unit 13 Worksheet: Inductance and Inductive Reactance (https://canvas.yc.edu/courses/31031/assignments/538899)	due by 10am
	 Units 13 Exam (https://canvas.yc.edu/courses/31031/assignments/538895)	due by 10am
Wed Dec 9, 2020	 Lab 13-1 (https://canvas.yc.edu/courses/31031/assignments/538916)	due by 11:59pm
	 Unit 14 Exam (https://canvas.yc.edu/courses/31031/assignments/538908)	due by 10am

Date	Details	Due
	 Unit 14 Worksheet: Capacitance and Capacitive Reactance (https://canvas.yc.edu/courses/31031/assignments/538903)	due by 10am
	 Lab final (https://canvas.yc.edu/courses/31031/assignments/538927)	due by 12:05pm
	 Lab 14-1 (https://canvas.yc.edu/courses/31031/assignments/538917)	due by 11:59pm
Fri Dec 11, 2020	 Final Exam (https://canvas.yc.edu/courses/31031/assignments/538905)	due by 5pm
	 Lab Final - Online (https://canvas.yc.edu/courses/31031/assignments/538910)	due by 5pm
Fri Aug 20, 2021	 Syllabus Agreement Fall 2021 (https://canvas.yc.edu/courses/31031/assignments/538882)	due by 11:59pm
Mon Aug 23, 2021	 Module 1 Powerpoint (https://canvas.yc.edu/courses/31031/assignments/538928)	due by 11:59pm
	 Unit 1 Worksheet: Lab and Safety Guidelines (https://canvas.yc.edu/courses/31031/assignments/538890)	due by 1pm
Tue Aug 31, 2021	 Unit 1 exam (https://canvas.yc.edu/courses/31031/assignments/538889)	due by 11:59pm
	 Lab 2-1 (https://canvas.yc.edu/courses/31031/assignments/538918)	due by 11:59pm

Date	Details	Due
Tue Sep 7, 2021	 Unit 2 Worksheet: Atomic Theory and Math https://canvas.yc.edu/courses/31031/assignments/538885	due by 6pm
	 Lab Unit 3 https://canvas.yc.edu/courses/31031/assignments/543583	due by 11:59pm
Wed Sep 8, 2021	 Unit 2 exam https://canvas.yc.edu/courses/31031/assignments/538892	due by 11:59pm
Mon Sep 13, 2021	 Unit 3 exam https://canvas.yc.edu/courses/31031/assignments/538901	due by 11:59pm
Tue Sep 14, 2021	 Lab unit 4 https://canvas.yc.edu/courses/31031/assignments/545513	due by 11:59pm
Wed Sep 15, 2021	 Unit 3 Worksheet: Voltage and Current https://canvas.yc.edu/courses/31031/assignments/538897	due by 10am
Sun Sep 19, 2021	 Unit 2 Worksheet: Atomic Theory and Math https://canvas.yc.edu/courses/31031/assignments/538885 (2 students)	due by 11:59pm
Wed Sep 22, 2021	 Unit 4 exam https://canvas.yc.edu/courses/31031/assignments/538893	due by 11:59pm
Thu Sep 30, 2021	 Unit 1 exam https://canvas.yc.edu/courses/31031/assignments/538889 (1 student)	due by 11:59pm
	 Unit 1 Worksheet: Lab and Safety Guidelines https://canvas.yc.edu/courses/31031/assignments/538890	due by 11:59pm

Date	Details	Due
	(1 student)	
	 Unit 2 exam https://canvas.yc.edu/courses/31031/assignments/538892 (2 students)	due by 11:59pm
	 Unit 3 exam https://canvas.yc.edu/courses/31031/assignments/538901 (1 student)	due by 11:59pm
	 Roll Call Attendance https://canvas.yc.edu/courses/31031/assignments/537788	