COURSE SYLLABUS

1 ECE 2030 - Electrical Circuit Fundamentals

2 Meeting Information

3 credits, 3 contact hours three 50-minute lectures each week

a. **Section 001:**
Lecture: MWF from 09:35 am to 10:25 am in Tolentine Hall 314A.,

b. **Section 002:**
Lecture: MWF from 10:40 am to 11:30 am in Tolentine Hall 310A.,

c. **Section 003:**
Lecture: MWF from 09:35 am to 10:25 am in Tolentine Hall 310A.,

d. **Section 004:**
Lecture: MWF from 10:40 am to 11:30 am in Tolentine Hall 316.,

3 Course Instructor(s), TA(s)

a. **Section 001:**

Class Instructor:	Liesl A. Klein <liesl.klein@villanova.edu>
Office Hours:	Monday and Thursday 11-12:15, or by appt.
Link for Office Hours:	

TA(s):

Ricky Stanton	rstanto3@villanova.edu
Office Hours:	, or by appt.

b. **Section 002:**

Class Instructor:	Alan B. Johnston <alan.johnston@villanova.edu>
Office Hours:	M11:30-12, W 9-9:30 in Tolentine or on Zoom, or by appt.
Link for Office Hours:	

TA(s):

Ricky Stanton	rstanto3@villanova.edu
Office Hours:	, or by appt.

c. **Section 003:**

Class Instructor:	Alan B. Johnston <alan.johnston@villanova.edu>
Office Hours:	M11:30-12, W 9-9:30 in Tolentine or on Zoom, or by appt.
Link for Office Hours:	

TA(s):
Ricky Stanton rstanto3@villanova.edu
Office Hours: , or by appt.

d. **Section 004:**
Class Instructor: Tommaso Cappello <tommaso.cappello@villanova.edu>, Liesl A. Klein <liesl.klein@villanova.edu>
Office Hours: Monday and Thursday 11-12:15, or by appt.
Link for Office Hours:

TA(s):
Ricky Stanton rstanto3@villanova.edu
Office Hours: , or by appt.

4 Textbook

zyBooks online textbook: , `https://learn.zybooks.com/zybook/VILLANOVAECE2030Fall2023`. REQUIRED.

a. **Other Supplemental Materials:** Sign in or create an account at learn.zybooks.com

Enter zyBook code:

VILLANOVAECE2030Fall2023

A subscription is 64 dollars. Students may begin subscribing on Aug 09, 2023 and the cutoff to subscribe is Dec 12, 2023. Subscriptions will last until Jan 12, 2024.

5 Specific Course Information

a. **Catalog Description**
Basic concepts, steady-state dc circuit analysis, network theorems, energy storage elements, complete response of first-order circuits, steady-state sinusoidal circuit analysis, AC systems and Laplace Transform.

b. **Prerequisites:** MAT 1505; **Co-requisites:** ECE 2031

c. Required for BS CPE and EE

6 Learning Objectives

a. Learn how to analyze electric circuits for voltage, current, and power with sources, resistors, inductors, and capacitors; Learn how to analyze circuits using a variety of techniques including Kirchhoff's Laws, Node Voltage Method, Mesh Currents, and Superposition; Learn how to analyze transient resistor/inductor and resistor/capacitor circuits; Learn how to analyze alternating current circuits using phasors, impedance, and complex power.

b.

ABET Student Outcomes						
1	2	3	4	5	6	7
X						

The above student outcomes are defined by the Accreditation Board for Engineering and Technology (ABET) as:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

7 List of Covered Topics

1. Basic Concepts
2. Resistive Circuits
3. Analysis Techniques
4. Network Theorems
5. Energy Storage Elements
6. Transient Behavior of First-Order Circuits
7. AC Circuit Analysis
8. AC Power

8 Tentative Schedule

Tentative schedules for all sections follow. Be sure to refer to the schedule for your specific section, if more than one is provided.

Tentative Schedule for **All Sections**

Class	Date	Topics
1	8/23	Introduction, series and parallel
2	8/25	Practice Quiz 1, Charge, current, voltage, ideal elements, voltage and current sources, Ohm's Law
3	8/28	KCL, KVL
4	8/30	Passive sign convention, dependent sources
5	9/1	Quiz 2, HW1 due, Voltage and current dividers
6	9/4	No Class
7	9/6	Wheatstone bridge, energy, power, Nodal analysis
8	9/8	Quiz 3, Supernode
9	9/11	Mesh analysis
10	9/13	Supermesh
11	9/15	Quiz 4, HW2 due, Superposition
12	9/18	Superposition continued
13	9/20	Review for Test 1
	9/22	**Test 1**
14	9/25	Go over Test 1
15	9/27	Thevenin, Source transformations
16	9/29	Quiz 5, HW3 due, Maximum power transfer theorem
17	10/2	Max power and Thevenin
18	10/4	Step and ramp
19	10/6	Quiz 6
	10/9	No Class
	10/11	No Class
	10/13	No Class
20	10/16	Capacitors
21	10/18	Capacitor D.C. steady state and stored energy
22	10/20	Quiz 7, HW4 due, Capacitor voltage division
23	10/23	Capacitors series and parallel
24	10/25	Review for Test 2
	10/27	**Test 2**
25	10/30	Go over Test 2
26	11/1	Inductors
27	11/3	Quiz 8, Inductors D.C. steady state
28	11/6	First order RC transients
29	11/8	First order RC continued, time to steady state
	11/10	Quiz 9, First order RC continued
	11/13	First order RL
30	11/15	First Order RL continued
31	11/17	Quiz 10, HW5 due, Sinusoids, standard cosine form
32	11/20	Complex math review
33	11/22	No Class
34	11/24	No Class
35	11/27	Phasors, Impedance
36	11/29	A.C. analysis, Impedance matching
37	12/1	Quiz 11, Impedance matching continued, Reactance
38	12/4	A.C. Power
39	12/6	Complex power, Reactive power
40	12/8	Quiz 12, HW6 due, A.C. Maximum power transfer
	12/11	Review for Final
	12/18	**Final 11:30 - 2pm**

9 Grading Policy

Your final grade will be determined from the following:

- Tests: 40% (Two tests, the lower is 15% and the higher is 25%)
- Homework and Participation: 15%
- Quizzes: 15%
- Final Exam: 30%

Letter grade scale: A(93–100), A–(90–92), B+(87–89), B(83–86), B–(80–82), C+(77–79), C(73–76), C–(70–72), D+(67–69), D(63–66), D–(60–62), F(<60)

Quizzes. There will be a 10 minute quiz at the beginning of class every week, which will be on Friday except for the weeks when there is a test or holiday, in which case it will be on Wednesday. Each quiz will cover the material from class, from the reading, and from the homework since the previous quiz. The quizzes will be closed book, no calculators unless explicitly specified, and no sheet of paper (note sheets). Make sure you get to class on time. Your top ten quiz scores will count; the quizzes with the lowest grades that you have taken will be dropped. We will be using the Respondus Lockdown browser with Webcam Monitoring (part of Blackboard) for quizzes, so make sure you have a webcam on your computer or iPad that works.

Tests. The two tests are closed book, no calculators, but a single 8 1/2 by 11 inch sheet of paper with information in your own handwriting will be allowed. No excuses for missed exams will be accepted other than certified medical excuses. If your watch stops or your car doesn't start on the day of a test, the zero you get will be the grade that counts for 15%. Makeup tests will not be given. If the test is moved to a different date, at least one week notice will be given. We will be using the Respondus Lockdown browser with Webcam Monitoring for tests as well.

Test 1 9/22 Material through 9/15
Test 2 10/27 Material through 10/20

10 HW Assignment and Laboratory Report Submission Policy

Homework and Participation. There are 6 homework assignments, due as listed on the schedule. Homework submissions are in PDF format only, uploaded to Blackboard. Late homework will have a 25% per week day grade deduction. Homework will count for 12% of the grade. Weekly Participation Activity problems will be assigned each week on a Monday, due by Friday of that week by midnight. The problems are interactive online problems in zyBooks, and are marked as a completion grade percentage (out of 100) only. The participation grade counts for 3% of the grade. Since the participation activity problems are tied to the Friday quiz subject, late submissions are not possible.

11 Attendance Policy

The full version of the official Villanova class attendance policy is posted at https://live-villanova-catalog.cleancatalog.io/class-attendance, but the main points are as follows.

Attendance is not mandatory except for during quizzes and tests. Makeups are only given for an excused absence, as described below.

Whenever possible, students should inform the instructor if they plan to be late or absent from class. In all cases, documentation is required to petition for *excused* absences to the Associate Dean for Student and Strategic Programs, Dr. Stephen Jones. The excused absence form is posted at: https://forms.office.com/r/H2kbHKLUmw.

Excused absences do not count towards a failure in the course for first year students. Absence from class does not release the student from assigned work. Students who miss an in-class obligation such as an exam, a presentation, etc., due to an excused absence will not be penalized - the instructor may offer a make-up test, arrange an alternative time for a presentation, exempt a student from the assignment, or provide another arrangement. In the case of illness or injury, the form must be submitted within 24 hours of missing a class. The University's list of excused absences for all students includes the following:

1. Participation in NCAA athletic competitions
2. Participation in special academic events such as: conferences, field trips, project competitions, etc., and in official university business such as student representatives attending meetings related to university governance
3. Attendance at significant events of the immediate family such as: funerals, weddings, etc.
4. Religious holidays - see the University's policy on Religious Holidays
5. College-approved participation in placement activities such as: job interviews, graduate school interviews, job fairs
6. Legally required absence such as: jury duty, court appearance, short-term military service
7. Documented serious illness or disability

12 Examination Policy

The College of Engineering has adopted the following general examination guidelines:

1. Students must arrive before the start of the examination. Under exceptional circumstances a student may need to arrive late, but he/she can enter the examination room no later than five (5) minutes after the start of the exam.
2. Cell phones must be turned off until the student exits the examination room.
3. The official Villanova class attendance policy must be followed when requesting excuses for absences or lateness to an examination.
4. Each student must write and sign the following statement, "I have neither given nor received any unauthorized assistance in the completion of this examination."
5. For online examinations, the instructor may implement video proctoring or other measures to ensure academic integrity. For consent purposes, the instructor will inform students in advance if (s)he plans to use any form of video-proctoring and whether the examination will be recorded.

13 Academic Integrity Policy

The College of Engineering is committed to creating an environment of academic integrity and ethical decision-making that we hope is reflected in the actions of our students and graduates. As Villanova students, integrity is central to the University mission. As engineers, our code of conduct requires us to place honor and integrity at the forefront of everything we do. As engineering students, it is expected that you will begin to adopt these values and instill them into your work

habits. Students violating the academic integrity policy will receive a zero on that assignment or exam and the violation will be reported to the Associate Dean for Academic Affairs. The University's academic integrity policy can be found on the following web page:
https://live-villanova-catalog.cleancatalog.io/academic-integrity-0.

14 Adherence to the Student Code of Conduct

Students are expected to act in a professional and respectful manner to their fellow students, faculty, and staff. Students should become acquainted with and understand the responsibilities set forth in the Student Handbook, especially those in the sections on Policy and Regulations. Adherence to university regulations is expected and required for successful completion of the program of studies. Enforcement within the classroom of policies regarding classroom behavior is the responsibility of the faculty member. All other discipline problems are to be referred to the Dean of Students.

15 Inclusive Classroom

This classroom is a place where you will be treated with respect; we welcome individuals of all ages, backgrounds, beliefs, ethnicities, gender, gender identities and expressions, sexual orientation, and other visible and non-visible differences. All members of this class are expected to contribute to a respectful, welcoming, and inclusive environment to allow all among us to learn and flourish.

16 Students with Disabilities

It is the policy of the university to make reasonable academic accommodations for qualified individuals with disabilities. If you are a person with a disability (non-physical) please register with the office of Learning Support Services (LSS) by emailing Learning.support.services@villanova.edu or by phoning 610-519-5176 as soon as possible. Registration is *required* in order to receive accommodations. In addition, please contact the instructor during office hours in order to make the appropriate arrangements.

The Office of Disability Services (ODS) collaborates with students, faculty, staff, and community members to create diverse learning environments that are usable, equitable, inclusive and sustainable. The ODS provides Villanova University students with physical the necessary support to successfully complete their education and participate in activities available to all students. If you have a diagnosed disability and plan to utilize academic accommodations, please contact and register with Gregory Hannah, advisor to students with disabilities at 610-519-3209 or visit the office on the second floor of the Connelly Center.

17 Tutoring Services

Villanova's tutoring services include The Writing Center, The Learner's Studio, and The Center for Speaking and Presentation. These services are offered free of charge to students. Drop in as-needed or book a regular weekly session to supercharge your academic success. Sessions can be 30 or 60 minutes in length.

Register for an account and book sessions in advance at villanova.mywconline.com. If you don't see your class listed, request a tutor for a missing subject at: tutorrequest.villanova.edu For more information, contact Juliana Struder at juliana.studer@villanova.edu or at 610-519-5862.

18 Online Expectations

Some or all sessions of this class may be recorded for educational purposes and for later playback. In order to foster a professional environment, please wear appropriate clothes, refrain from eating, mute your microphone if you are not talking to eliminate background noise and select an appropriate setting free of distractions. You may turn off your webcam for privacy reasons unless explicitly instructed not to do so by the instructor (such as during the conduct of online examinations).

19 Electronics Policy

The use of electronic devices, such as phones, laptops, tablets, calculators, etc., during class is generally allowed, unless their use causes a disturbance to others. During examinations, the use of any electronic device is prohibited, unless it is expressly authorized by the instructor.

Students are prohibited from making any audio or visual recordings (including taking photographs) of lectures, discussions, or other classroom activities, unless a student (1) has written permission in advance from the instructor, or (2) is permitted to record under terms and conditions as approved by the University's Office of Disability Services or Learning Support Services. Students who have received approval to record classes as an academic accommodation must provide supporting documentation from the Office of Disability Services or Learning Support Services in advance of any recording. Students may use authorized recordings only for the purposes of individual study in the course, and may not disseminate or share them with a wider audience without explicit permission.

20 Copyright Policy

The materials used in Villanova University courses ("Course Materials") generally represent the intellectual property of course instructors, third parties and/or the university which may not be disseminated or reproduced in any form for public distribution (e.g., sale, exchange, etc.) without the written permission of the course instructor. Course materials include all written or electronic documents and materials, including syllabi, current and past examination questions/answers, and presentations such as lectures, videos, slides, etc., provided by a course instructor. Course materials may only be used by students enrolled in the course for academic (course-related) purposes.

Published course readings (book chapters, articles, reports, etc.) available in "Blackboard" are copyrighted materials. These works are made available to students through licensed databases or fair use. They are protected by copyright law, and may not be further disseminated or reproduced in any form for distribution (e.g. uploading to websites, sale, exchange, etc.) without the permission of the copyright owner.

Follow these links for more information on Intellectual Property, Copyright, and Computer Acceptable Use.

21 Professorial Duties

It is important to note that teaching is one of the many duties that professors perform as part of their job responsibilities. In addition to teaching, professors perform research, advise graduate students, edit journals and review journal articles, serve on committees for the university and professional societies, travel to conferences to remain abreast of current developments and to present their results... to name just a few commitments.

Prepared by: Alan B. Johnston *January 11, 2024*