COLLEGE OF ENGINEERING
GENERAL ENGINEERING

ELEC201 / Fundamentals of Electric Circuits

Fall 20xx

Instructor Information

Name:
Academic Title:
Office:
Phone:
E-mail:
Office Hours:
If you need to see me outside of the posted office hours, please set up an appointment with me, either by speaking to me before or after class, or by sending me an e-mail message.

TA Information

Name:
Office:
Phone:
E-mail:
Office Hours:

Class/Laboratory Schedule

Class:
Laboratory:

Coordinator Information

Name:
Office:
Tel:
E-mail:

Course Information

Catalog Description:
Electric current, voltage, power, and dependent and independent sources, Kirchhoff's current and voltage laws, Ohm's law. DC circuit analysis, superposition, Thevenin's theorems. Operational Amplifiers. Capacitance and Inductance. AC Circuits Analysis, phasor representation, complex impedances. Sinusoidal steady state analysis. Instantaneous and average AC power, RMS value, Complex AC power. Several laboratory experiments to reinforce material from the lectures will be conducted.

Credits:
3
Contact Hours:
2 Lecture hours and 3 Lab hours.

Prerequisites:
MATH 102 and PHYS 193

Textbook(s):
Alexander and Sadiku "Fundamentals of Electric Circuits" Seventh Edition McGraw Hill.

References:
Nilsson and Riedel "Electric Circuits" Seventh edition Prentice Hall.

Course Objectives:
The course objective is to:

1. Introduce fundamental concepts of electric circuits.
2. Provide students with basic electric circuits analysis techniques.
3. Emphasize practical engineering-based applications.

Course Learning Outcomes (CLOs):

1. Define concepts of electric current, voltage, electric power, and Kirchhoff's current and voltage laws
2. Ohm's laws. and simplification of series/parallel connections
3. Apply nodal analysis, mesh analysis, to solve DC circuits.
4. Use superposition, Thevenin theorems for dc circuit analysis.
5. Analyze operational amplifier circuits
6. Describe inductors, capacitors, and their properties.
7. Solve series/Parallel AC circuits.
8. Calculate the real, reactive and apparent power in AC circuits,
9. Use essential EE instruments such as Digital Multimeters to conduct dc circuit experiments.
10. Analyze electric circuit using simulation software.

Relationship of Course Learning Outcomes (CLOs) to Student Outcomes (SOs):

Course Learning Outcomes (CLOs)	**Related Student Outcomes (SOs)**						
	1	**2**	**3**	**4**	**5**	**6**	**7**
1	✓						
2	✓						
3	✓						
4	✓						
5	✓						
6	✓						
7	✓						
8	✓						
9					✓	✓	
10							✓

Student Outcomes (SOs)

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Topics Covered:

Topics	**Chapter***	**Section***	**Weeks**
Electric current, voltage, power, and voltage and current sources	1		1
Ohm's law	2		1
Kirchhoff's current and voltage laws	2		1
resistive circuits	2		1
Nodal and Mesh analysis	3	2, 4	1
Scaling, Superposition, Thevenin's Theorem	4		1
Operational amplifiers	5	2, 3, 4	1
Operational amplifier applications	5	5, 6, 7	1
Inductors and capacitors properties	6		1
Phasor and impedance	9		1
Impedances combination	9		1
Series / Parallel AC analysis	9		1
AC power definition	11	2, 5	1
Complex power	11	6, 7	1
Total			**14**

*Optional

List of Laboratory Experiments Performed:

Lab No,	**Title**
Lab 1	Breadboard, Trainer Kit & Multisim
Lab 2	Resistors ,Uncertainties & Instrumentation
Lab 3	Ohms Law with Series - Parallel Circuits
Lab 4	Kirchhoff's Laws, Mesh and Nodal Analysis
Lab 5	Delta–Star Connection with Superposition
Lab 6	Thevenin and Maximum Power Transfer Theorem
Lab 7	DC Bridges
Lab 8	Practical DC Circuits
Lab 9	Sinusoidal Signal Parameters and Phase-Shift Measurement

Method of Instruction

Lectures (a combination of PowerPoint and whiteboard delivery will be used), lab sessions and class tutorial.

Assessment Methods and Grading Policy

The following grading policy cannot be altered without the approval of the department board and head of department authorization.

Homework:	5%
Quizzes:	15%
Lab Work:	15%
Lab exam:	5%
Midterm Exam(s):	25%
Final Exam:	35%

ABET Contribution of Course to Professional Component

Subject Area (Credit Hours)
College-Level Math & Basic Science: 5%
Engineering : 90%
Engineering Design : 5%
Broad Education : 0%

Computer/Software Usage

Word, PowerPoint, Multisim used for some problems solution and lab experiments.

Laboratory Projects

Laboratory work includes experiments on ohm's law, nodal analysis, superposition theorem, Thevenin theorem, maximum power transfer theorem, etc.

Course Ground Rules

- **Taking Notes:** Students are responsible for taking notes during the lecture. Exams will include some of the materials discussed in class in addition to those given in the textbook and class notes.
- **Attendance:** According to QU policies, attendance is mandatory; more than 25% absence will not qualify you for the course credit.
- **Late arrival:** Coming to class after 05 minutes, will result in absence.
- **Homework:** Homework should be submitted through Blackboard before the due date. Deadlines for assignments are strict; 50% will be deducted for each day after the deadline (you get zero marks if two days pass the deadline). Students should review their marks on the blackboard, and if any inquiry should contact the TA by email within 48 hours after the grade has been posted; thereafter, there should be no discussion on the grades.
- **Blackboard:** Check the course website frequently on Blackboard for updates (e.g., announcements, lecture notes, etc.).

- **Communications:** Students must use the assigned university e-mail address rather than a personal e-mail address. Writing emails in a proper format is required (communication skills are part of the course)
- **Cheating and/or Plagiarism:** Strict rules will apply in accordance with Qatar University regulations and policies in case of any cheating and/or plagiarism. Check the undergraduate students' handbook for further details on University policies.
- **Mobiles/Smart Devices:** Switch off/silent mobiles during lecture time. Mobile phones/smart devices are not permitted in the classroom during exams.

University Code of Conduct

- In accordance with Article 6 of the Student Code of Conduct at Qatar University, academic violations include a range of actions, one of which pertains to submitting work that is not the individual's own production. This includes using creative artificial intelligence tools such as ChatGPT to produce content, images, videos, or programming code and presenting it as original work.
- Therefore, students are cautioned that using artificial intelligence tools such as ChatGPT or any similar tools to produce academic content and present it as their own work is considered plagiarism, exposing the student to disciplinary penalties as stipulated in Qatar University's Student Code of Conduct. In light of this, we urge all students to adhere to ethical standards in all assignments and academic work and to seek guidance from the course instructor when unsure about the proper and ethical use of artificial intelligence sources in completing assignments, duties, and academic tasks.
- As such, a student is expected not to engage in behaviors that compromise their integrity, as well as the integrity of QU. Further information regarding the University Code of Conduct may be found on the web at http://www.qu.edu.qa/students/code-of-conduct

Support for Students with Special Needs

It is Qatar University policy to provide educational opportunities that ensure fair, appropriate and reasonable accommodation to students who have disabilities that may affect their ability to participate in course activities or meet course requirements. Students with disabilities are encouraged to contact their Instructor to ensure that their individual needs are met. The University, through its Inclusion and Special Needs Support Center, will exert all efforts to accommodate individuals' needs.

Contact Information for Inclusion and Special Needs Support Center:
Tel-Female: (00974) 4403 7972
Tel-Male: (00974) 4403 7946
Location: Student Activities Building
Email: specialneeds@qu.edu.qa

Academic Support and Learning Resources

The University Student Learning Support Center (SLSC) provides academic support services to male and female students at QU. The SLSC is a supportive environment where students can seek assistance with academic coursework, writing assignments, transitioning to college academic life, and other academic issues. SLSC programs include: Peer Tutoring, the Writing Lab, Writing Workshops, and Academic Success Workshops. Students may also seek confidential academic counseling from the professional staff at the Center.

Contact Information for Students Support and Learning Resources:
Tel: (00974) 4403 3870
Fax: (00974) 4403 3871
Location: Female Student Activities Building
E-mail: learningcenter@qu.edu.qa

College of Engineering Learning Support

Contact Information for College of Engineering Learning Support:
Females
Tel: (+974) 4403 6380
Email: CENG.SuccessOasis.F@qu.edu.qa
Males
Tel: (+974) 4403 6388
Email: CENG.SuccessOasis.M@qu.edu.qa

Sessions' Booking
Females
1- One-to-one sessions' registration via Simplybook:
https://crulearningfemales.simplybook.me
2- Weekly sessions via email invitation from Engineering Success Oasis (ESO)
Males
1- One-to-one sessions' registration via Simplybook:
https://crulearningmales.simplybook.me
2- Weekly sessions via email invitation from Engineering Success Oasis (ESO)

Student Complaints Policy

Students at Qatar University have the right to pursue complaints related to faculty, staff, and other students. The nature of the complaints may be either academic or non-academic. For more information about the policy and processes related to this policy, you may refer to the student handbook.

Declaration

This syllabus and contents are subject to changes in the event of extenuating circumstances. The instructor (with the approval of the Head of Department) reserves the right to make changes as necessary. If changes are necessitated during the term of the course, the students will be notified by email communication and posting the notification on the online teaching tool Blackboard. It is the student's responsibility to check on announcements made while they were absent.

Faculty Name:
Last Modified:
Date: