ELECTRICAL CIRCUIT ANALYSIS – ESE271 Spring 2019

Harbans S. Dhadwal E-mail: <u>harbans.dhadwal@stonybrook.edu</u> Voice: 632 8396; Fax: 632 8494 Light Engineering, Room 213

LECTURE:

Tuesday and Thursday 11:30 am to 12:50 pm, Social & Behavioral Sci. S328

Recitations:	R01	Μ	12:00 pm – 12:53 pm Physics P128
	R02	W	12:00 pm – 12:53 pm Physics P128

OFFICE HOURS:

Tuesday and Thursday 9:00 am - 11:00 am, or by appointment

COURSE WEBSITE:

The course is registered with the Blackboard

Техтвоок:

Fundamentals of Electric Circuits, 6th edition. Charles K. Alexander and Matthew N.O. Sadiku, McGrawHill (2017) 10: 0078028221

GRADING POLICY:

The course grade will be calculated using the following weights:

Test 1	15%
Test 2	15%
CAD tool test	10%
Comprehensive Final	60%

HOMEWORK:

Homework will be assigned on a regular basis but NOT graded for credit. However, it will be collected and evaluated for common misunderstandings. You are strongly advised to do the homework assignments by the specified time.

CAD TOOLS:

PSpice and MATLAB assignments will be given on a regular basis for students to enhance proficiency in the analysis of electrical circuits and for introduction to circuit design.

Download free version of ORCAD PSpice tools from this link: <u>http://www.orcad.com/resources/download-orcad-lite?downloadrequestsuccess=true</u> MATLAB is accessible through SINC Sites, SoftWeb, Virtual SINC Site

RECITATIONS:

Recitations are used as specific CAD tool development sessions, as well as problem solving. These sessions provide students an opportunity to interact closely with the TA to go over specific difficulties encountered with assignments.

TEST POLICY:

- Use of all electronic devices is prohibited.
- Approved calculators allowed.
- All tests will be **closed book**.
- Student photo ID must be available for inspection.
- NO make up tests.
- Zero tolerance for academic dishonesty.

TEST SCHEDULE: Test dates are subject to change.

Test 1	Feb 26
Test 2	Apr 11
Final - cumulative	May 21: 11:15 am to 1:45 pm

ACADEMIC INTEGRITY STATEMENT:

Academic Integrity: Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at http://www.stonybrook.edu/uaa/academicjudiciary/

Americans with Disabilities Act

Americans with Disabilities Act: If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC(Educational Communications Center) Building, Room 128, (631)632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

Week 1 31-Jan Lecture 2. Resistor. Ohm's law. Kirchoff's laws. Week 2 5-Feb Lecture 3. Nodal and Mesh analysis. Week 3 12-Feb Lecture 5. Circuit theorems I Week 3 12-Feb Lecture 6. Dependent sources and operational amplifiers. Week 4 19-Feb Lecture 7. Circuits with operational amplifiers Week 4 26-Feb Test 1 Week 6 5-Mar Lecture 10. Inductors. Week 7 12-Mar Lecture 11. First order RC and RL circuits. Time constants. Week 7 14-Mar Lecture 13. AC circuits: Sinusoids and phasors. Impedance. First origonits. Week 8 x Spring recess Week 9 26-Mar Lecture 14. AC steady state. Nodal analysis. Week 10 4-Apr Lecture 15. AC steady state. Nodal analysis. Week 11 11-Apr Lecture 16. AC power analysis. Week 11 9-Apr Lecture 19. Frequency response function. Bode plots. Week 11 11-Apr Test 2. Week 12 16-Apr Lecture 19. Frequency response function. Bode plots. Week 13 23-Apr Lecture 20. Resonant filters. Week 14 30-A	1	1	
31-Jan Lecture 2. Resistor. Ohm's law. Kirchoff's laws. Week 2 5-Feb Lecture 3. Nodal and Mesh analysis. Week 3 12-Feb Lecture 4. Circuit theorems I Week 3 12-Feb Lecture 5. Circuit theorems II Week 4 19-Feb Lecture 6. Dependent sources and operational amplifiers. Week 4 19-Feb Lecture 7. Circuits with operational amplifiers Week 5 26-Feb Test 1 28-Feb Lecture 9. Capacitors. Week 6 5-Mar Lecture 10. Inductors. Week 7 12-Mar Lecture 11. First order RC and RL circuits. Time constants. Week 7 12-Mar Lecture 12. Second order RLC circuits Week 8 x Spring recess Week 9 26-Mar Lecture 13. AC circuits: Sinusoids and phasors. Impedance. F Week 8 x Spring recess Week 9 26-Mar Lecture 15. AC steady state. Nodal analysis. Week 10 2-Apr Lecture 17. Magnetically coupled circuits. Transformers. Week 11 9-Apr Lecture 19. Frequency response function. Bode plots. Week 12 16-Apr Lecture 19. Frequency response function. Bode plots. </td <td rowspan="2">Week 1</td> <td>29-Jan</td> <td>Lecture 1. Basic concepts: current, voltage, power.</td>	Week 1	29-Jan	Lecture 1. Basic concepts: current, voltage, power.
Week 2 7-Feb Lecture 4. Circuit theorems I Week 3 12-Feb Lecture 5. Circuit theorems II Week 4 14-Feb Lecture 6. Dependent sources and operational amplifiers. Week 4 19-Feb Lecture 7. Circuits with operational amplifiers Week 4 21-Feb Lecture 8. Material review. Week 5 26-Feb Test 1 Week 6 7-Mar Lecture 9. Capacitors. 5-Mar Lecture 10. Inductors. 7-Mar Lecture 12. Second order RL circuits. Time constants. Week 7 12-Mar Lecture 13. AC circuits: Sinusoids and phasors. Impedance. F Week 8 x Spring recess Week 9 26-Mar Lecture 14. AC steady state. Nodal analysis. Week 10 2-Apr Lecture 15. AC steady state. Mesh analysis. Week 11 2-Apr Lecture 16. AC power analysis. Week 11 4-Apr Lecture 17. Magnetically coupled circuits. Transformers. Week 12 9-Apr Lecture 19. Frequency response function. Bode plots. Week 11 11-Apr Test 2. Week 12 16-Apr Lecture 20. Resonant filters. Week 13		31-Jan	Lecture 2. Resistor. Ohm's law. Kirchoff's laws.
7-FebLecture 4. Circuit theorems IWeek 312-FebLecture 5. Circuit theorems II14-FebLecture 6. Dependent sources and operational amplifiers.Week 419-FebLecture 7. Circuits with operational amplifiersWeek 521-FebLecture 8. Material review.Week 626-FebTest 128-FebLecture 9. Capacitors.Week 65-MarLecture 10. Inductors.7-MarLecture 11. First order RC and RL circuits. Time constants.Week 714-MarLecture 12. Second order RLC circuitsWeek 8xSpring recessWeek 926-MarLecture 14. AC steady state. Nodal analysis.Week 102-AprLecture 15. AC steady state. Mesh analysis.Week 119-AprLecture 17. Magnetically coupled circuits. Transformers.Week 1210-AprLecture 19. Frequency response function. Bode plots.Week 1323-AprLecture 20. Resonant filters.Week 1423-AprLecture 21. Laplace Transform.Week 1430-AprLecture 23. Circuits in s-domain. Transfer functions.Week 1420-AprLecture 24. Step and impulse response. Poles. Stable circuits	Week 2	5-Feb	Lecture 3. Nodal and Mesh analysis.
Week 3 14-Feb Lecture 6. Dependent sources and operational amplifiers. Week 4 19-Feb Lecture 7. Circuits with operational amplifiers Week 5 21-Feb Lecture 8. Material review. Week 6 26-Feb Test 1 Week 6 5-Mar Lecture 10. Inductors. Week 7 12-Mar Lecture 11. First order RC and RL circuits. Time constants. Week 7 14-Mar Lecture 12. Second order RLC circuits Week 8 x Spring recess Week 9 26-Mar Lecture 14. AC steady state. Nodal analysis. Week 10 2-Apr Lecture 16. AC power analysis. Week 11 9-Apr Lecture 17. Magnetically coupled circuits. Transformers. Week 12 16-Apr Lecture 19. Frequency response function. Bode plots. Week 11 23-Apr Lecture 20. Resonant filters. Week 13 23-Apr Lecture 21. Laplace Transform. Week 14 30-Apr Lecture 23. Circuits in s-domain. Transfer functions. Week 14 30-Apr Lecture 24. Step and impulse response. Poles. Stable circuits.		7-Feb	Lecture 4. Circuit theorems I
14-Feb Lecture 6. Dependent sources and operational amplifiers.Week 419-Feb Lecture 7. Circuits with operational amplifiersWeek 521-Feb Lecture 8. Material review.Week 628-Feb Test 1Week 65-Mar Lecture 9. Capacitors.Week 712-Mar Lecture 10. Inductors.T4-MarLecture 11. First order RC and RL circuits. Time constants.Week 712-Mar Lecture 12. Second order RLC circuitsWeek 8xSpring recessWeek 926-Mar Lecture 14. AC steady state. Nodal analysis.Week 1028-Mar Lecture 15. AC steady state. Mesh analysis.Week 112-Apr Lecture 16. AC power analysis.Week 119-Apr Lecture 18. Material review.11-Apr Test 2.11-Apr Test 2.Week 1216-Apr Lecture 19. Frequency response function. Bode plots.Week 1323-Apr Lecture 20. Resonant filters.Week 1423-Apr Lecture 21. Laplace Transform.Week 1430-Apr Lecture 23. Circuits in s-domain. Transfer functions.Week 142-Apr Lecture 24. Step and impulse response. Poles. Stable circuits	Week 3	12-Feb	Lecture 5. Circuit theorems II
Week 421-FebLecture 8. Material review.Week 526-FebTest 128-FebLecture 9. Capacitors.Week 65-MarLecture 10. Inductors.7-MarLecture 11. First order RC and RL circuits. Time constants.Week 712-MarLecture 12. Second order RLC circuitsWeek 8xSpring recessWeek 926-MarLecture 14. AC steady state. Nodal analysis.Week 102-AprLecture 15. AC steady state. Mesh analysis.Week 112-AprLecture 16. AC power analysis.Week 1211-AprLecture 18. Material review.Week 1216-AprLecture 19. Frequency response function. Bode plots.Week 1323-AprLecture 20. Resonant filters.Week 1323-AprLecture 21. Laplace Transform.Week 1430-AprLecture 23. Circuits in s-domain. Transfer functions.Week 142-AprLecture 24. Step and impulse response. Poles. Stable circuits		14-Feb	Lecture 6. Dependent sources and operational amplifiers.
21-FebLecture 8. Material review.Week 526-FebTest 128-FebLecture 9. Capacitors.Week 65-MarLecture 10. Inductors.7-MarLecture 11. First order RC and RL circuits. Time constants.Week 712-MarLecture 12. Second order RLC circuits14-MarLecture 13. AC circuits: Sinusoids and phasors. Impedance. F circuits.Week 8xSpring recessWeek 926-MarLecture 14. AC steady state. Nodal analysis.Week 102-AprLecture 15. AC steady state. Mesh analysis.Week 119-AprLecture 17. Magnetically coupled circuits. Transformers.Week 119-AprLecture 18. Material review.Week 1216-AprLecture 20. Resonant filters.Week 1323-AprLecture 21. Laplace Transform.Week 1420-AprLecture 22. Laplace Transform.Week 1430-AprLecture 23. Circuits in s-domain. Transfer functions.Week 147-MayLecture 24. Step and impulse response. Poles. Stable circuits.	Week 4	19-Feb	Lecture 7. Circuits with operational amplifiers
Week 528-FebLecture 9. Capacitors.Week 65-MarLecture 10. Inductors.7-MarLecture 11. First order RC and RL circuits. Time constants.Week 712-MarLecture 12. Second order RLC circuitsWeek 714-MarLecture 13. AC circuits: Sinusoids and phasors. Impedance. F circuits.Week 8xSpring recessWeek 926-MarLecture 14. AC steady state. Nodal analysis.Week 102-AprLecture 16. AC power analysis.Week 119-AprLecture 17. Magnetically coupled circuits. Transformers.Week 1211-AprTest 2.Week 1323-AprLecture 20. Resonant filters.Week 1423-AprLecture 21. Laplace Transform.Week 1430-AprLecture 23. Circuits in s-domain. Transfer functions.Week 1430-AprLecture 24. Step and impulse response. Poles. Stable circuits		21-Feb	Lecture 8. Material review.
28-FebLecture 9. Capacitors.Week 65-MarLecture 10. Inductors.7-MarLecture 11. First order RC and RL circuits. Time constants.Week 712-MarLecture 12. Second order RLC circuits14-MarLecture 13. AC circuits: Sinusoids and phasors. Impedance. F circuits.Week 8xSpring recessWeek 926-MarLecture 14. AC steady state. Nodal analysis.Week 928-MarLecture 15. AC steady state. Mesh analysis.Week 102-AprLecture 16. AC power analysis.Week 119-AprLecture 17. Magnetically coupled circuits. Transformers.Week 119-AprLecture 18. Material review.11-AprTest 2.Week 1216-AprLecture 20. Resonant filters.Week 1323-AprLecture 21. Laplace Transform.Week 1430-AprLecture 23. Circuits in s-domain. Transfer functions.Week 1430-AprLecture 24. Step and impulse response. Poles. Stable circuits7-MayLecture 24. Step and impulse response. Poles. Stable circuits	Week 5	26-Feb	Test 1
Week 67-MarLecture 11. First order RC and RL circuits. Time constants.Week 712-MarLecture 12. Second order RLC circuits14-MarLecture 13. AC circuits: Sinusoids and phasors. Impedance. F circuits.Week 8xSpring recessWeek 926-MarLecture 14. AC steady state. Nodal analysis.Week 1028-MarLecture 15. AC steady state. Mesh analysis.Week 112-AprLecture 16. AC power analysis.Week 119-AprLecture 17. Magnetically coupled circuits. Transformers.Week 1216-AprLecture 18. Material review.Week 1216-AprLecture 20. Resonant filters.Week 1323-AprLecture 21. Laplace Transform.Week 1430-AprLecture 23. Circuits in s-domain. Transfer functions.Week 1430-AprLecture 24. Step and impulse response. Poles. Stable circuits7-MayLecture 25. Two port networks		28-Feb	Lecture 9. Capacitors.
7-MarLecture 11. First order RC and RL circuits. Time constants.Week 712-MarLecture 12. Second order RLC circuits14-MarLecture 13. AC circuits: Sinusoids and phasors. Impedance. F circuits.Week 8xSpring recessWeek 926-MarLecture 14. AC steady state. Nodal analysis.Week 1028-MarLecture 15. AC steady state. Mesh analysis.Week 102-AprLecture 16. AC power analysis.Week 119-AprLecture 17. Magnetically coupled circuits. Transformers.Week 129-AprLecture 18. Material review.Week 1211-AprTest 2.Week 1323-AprLecture 20. Resonant filters.Week 1425-AprLecture 21. Laplace Transform.Week 1430-AprLecture 23. Circuits in s-domain. Transfer functions.Week 142-MayLecture 24. Step and impulse response. Poles. Stable circuits	Week 6	5-Mar	Lecture 10. Inductors.
Week 7Lecture 13. AC circuits: Sinusoids and phasors. Impedance. F circuits.Week 8xSpring recessWeek 926-MarLecture 14. AC steady state. Nodal analysis.Week 928-MarLecture 15. AC steady state. Mesh analysis.Week 102-AprLecture 16. AC power analysis.Week 114-AprLecture 17. Magnetically coupled circuits. Transformers.Week 119-AprLecture 18. Material review.Week 1111-AprTest 2.Week 1216-AprLecture 20. Resonant filters.Week 1323-AprLecture 21. Laplace Transform.Week 1430-AprLecture 23. Circuits in s-domain. Transfer functions.Week 1430-AprLecture 24. Step and impulse response. Poles. Stable circuits		7-Mar	Lecture 11. First order RC and RL circuits. Time constants.
14-Mar14-Mar14-Maricrcuits.icrcuits.Week 8xSpring recessWeek 926-MarLecture 14. AC steady state. Nodal analysis.Week 1028-MarLecture 15. AC steady state. Mesh analysis.Week 102-AprLecture 16. AC power analysis.Week 119-AprLecture 17. Magnetically coupled circuits. Transformers.Week 119-AprLecture 18. Material review.Week 1216-AprLecture 19. Frequency response function. Bode plots.Week 1218-AprLecture 20. Resonant filters.Week 1323-AprLecture 21. Laplace Transform.Week 1430-AprLecture 23. Circuits in s-domain. Transfer functions.Week 1410-AprLecture 24. Step and impulse response. Poles. Stable circuits		12-Mar	Lecture 12. Second order RLC circuits
Week 926-MarLecture 14. AC steady state. Nodal analysis.Week 1028-MarLecture 15. AC steady state. Mesh analysis.Week 102-AprLecture 16. AC power analysis.4-AprLecture 17. Magnetically coupled circuits. Transformers.Week 119-AprLecture 18. Material review.11-AprTest 2.Week 1216-AprLecture 19. Frequency response function. Bode plots.Week 1323-AprLecture 20. Resonant filters.Week 1423-AprLecture 21. Laplace Transform.Week 1430-AprLecture 23. Circuits in s-domain. Transfer functions.Week 147-MayLecture 24. Step and impulse response. Poles. Stable circuits	Week 7	14-Mar	Lecture 13. AC circuits: Sinusoids and phasors. Impedance. RLC circuits.
Week 928-MarLecture 15. AC steady state. Mesh analysis.Week 102-AprLecture 16. AC power analysis.4-AprLecture 17. Magnetically coupled circuits. Transformers.Week 119-AprLecture 18. Material review.11-AprTest 2.Week 1216-AprLecture 19. Frequency response function. Bode plots.Week 1323-AprLecture 20. Resonant filters.Week 1325-AprLecture 21. Laplace Transform.Week 1430-AprLecture 23. Circuits in s-domain. Transfer functions.Week 142-MayLecture 24. Step and impulse response. Poles. Stable circuits	Week 8	х	Spring recess
28-MarLecture 15. AC steady state. Mesh analysis.Week 102-AprLecture 16. AC power analysis.4-AprLecture 17. Magnetically coupled circuits. Transformers.Week 119-AprLecture 18. Material review.11-AprTest 2.Week 1216-AprLecture 19. Frequency response function. Bode plots.Week 1218-AprLecture 20. Resonant filters.Week 1323-AprLecture 21. Laplace Transform.Week 1430-AprLecture 23. Circuits in s-domain. Transfer functions.Week 147-MayLecture 24. Step and impulse response. Poles. Stable circuits	Week 9	26-Mar	Lecture 14. AC steady state. Nodal analysis.
Week 104-AprLecture 17. Magnetically coupled circuits. Transformers.Week 119-AprLecture 18. Material review.11-AprTest 2.Week 1216-AprLecture 19. Frequency response function. Bode plots.Week 1218-AprLecture 20. Resonant filters.Week 1323-AprLecture 21. Laplace Transform.Week 1430-AprLecture 22. Laplace Transform.Week 142-MayLecture 24. Step and impulse response. Poles. Stable circuits7-MayLecture 25. Two port networks		28-Mar	Lecture 15. AC steady state. Mesh analysis.
4-AprLecture 17. Magnetically coupled circuits. Transformers.Week 119-AprLecture 18. Material review.11-AprTest 2.Week 1216-AprLecture 19. Frequency response function. Bode plots.Week 1218-AprLecture 20. Resonant filters.Week 1323-AprLecture 21. Laplace Transform.Week 1430-AprLecture 22. Laplace Transform.Week 1430-AprLecture 23. Circuits in s-domain. Transfer functions.Yeek 142-MayLecture 24. Step and impulse response. Poles. Stable circuits	Week 10	2-Apr	Lecture 16. AC power analysis.
Week 11ITest 2.Week 1216-AprLecture 19. Frequency response function. Bode plots.Week 1218-AprLecture 20. Resonant filters.Week 1323-AprLecture 21. Laplace Transform.Week 1325-AprLecture 22. Laplace Transform.Week 1430-AprLecture 23. Circuits in s-domain. Transfer functions.Week 142-MayLecture 24. Step and impulse response. Poles. Stable circuits7-MayLecture 25. Two port networks		4-Apr	Lecture 17. Magnetically coupled circuits. Transformers.
11-AprTest 2.Week 1216-AprLecture 19. Frequency response function. Bode plots.18-AprLecture 20. Resonant filters.Week 1323-AprLecture 21. Laplace Transform.25-AprLecture 22. Laplace Transform.Week 1430-AprLecture 23. Circuits in s-domain. Transfer functions.Veek 142-MayLecture 24. Step and impulse response. Poles. Stable circuits7-MayLecture 25. Two port networks	Week 11	9-Apr	Lecture 18. Material review.
Week 12 18-Apr Lecture 20. Resonant filters. Week 13 23-Apr Lecture 21. Laplace Transform. Week 14 25-Apr Lecture 22. Laplace Transform. Week 14 30-Apr Lecture 23. Circuits in s-domain. Transfer functions. 2-May Lecture 24. Step and impulse response. Poles. Stable circuits 7-May Lecture 25. Two port networks		11-Apr	Test 2.
18-AprLecture 20. Resonant filters.Week 1323-AprLecture 21. Laplace Transform.25-AprLecture 22. Laplace Transform.Week 1430-AprLecture 23. Circuits in s-domain. Transfer functions.2-MayLecture 24. Step and impulse response. Poles. Stable circuits7-MayLecture 25. Two port networks		16-Apr	Lecture 19. Frequency response function. Bode plots.
Week 13 25-Apr Lecture 22. Laplace Transform. Week 14 30-Apr Lecture 23. Circuits in s-domain. Transfer functions. 2-May Lecture 24. Step and impulse response. Poles. Stable circuits 7-May Lecture 25. Two port networks	Week 12	18-Apr	Lecture 20. Resonant filters.
Week 13 25-Apr Lecture 22. Laplace Transform. Week 14 30-Apr Lecture 23. Circuits in s-domain. Transfer functions. 2-May Lecture 24. Step and impulse response. Poles. Stable circuits 7-May Lecture 25. Two port networks	Week 13	23-Apr	Lecture 21. Laplace Transform.
Week 1430-AprLecture 23. Circuits in s-domain. Transfer functions.2-MayLecture 24. Step and impulse response. Poles. Stable circuits7-MayLecture 25. Two port networks		-	
2-May Lecture 24. Step and impulse response. Poles. Stable circuits 7-May Lecture 25. Two port networks	Week 14		
7-May Lecture 25 Two port networks		2-May	Lecture 24. Step and impulse response. Poles. Stable circuits.
	Week 15		
9-May Lecture 26. Material review.			