

SYLLABUS – Fall 2019

EE 206 Circuit Analysis 1	MWF, 9:00 - 9:50 p.m. – EE 125
-------------------------------------	---------------------------------------

<u>INSTRUCTOR</u>	<p>Ben Braaten, Professor, Department of Electrical and Computer Engineering, 101B E.E. Bldg., NDSU e-mail: Benjamin.Braaten@ndsu.edu Voice: (701) 231-7608. Messages through ECE Department office staff: (701) 231-7019.</p>	
	<p>Campus Mail: Ben Braaten Electrical Engr. ECE Dept. NDSU Campus</p>	<p>U.S. Mail: Ben Braaten ECE Dept. NDSU Fargo, ND 58105-5285</p>
<u>COURSE DESCRIPTION</u>	<p>The study of linear circuits, component models, circuit laws, transient analysis, design rules, and CAD.</p>	
<u>COURSE OBJECTIVES</u>	<p>By the end of the semester, students should: Be able to solve for the currents and voltages in a circuit with steady-state DC and AC inputs. Be able to write N equations to solve for N unknowns using Voltage-Nodes and Current-Loop techniques Be able to design amplifiers with gains less than one, more than one, and with a negative gain. Be able to analyze mathematical functions with complex numbers. Be able to use circuit simulators (PartSim) to simulate the response of circuits to steady-state inputs. Be able to build circuits in lab and measure the steady-state response</p>	
<u>OFFICE HOURS</u>	<p>Office hours: Door is mostly open or ask for an appointment at another time. It's always a good idea to make an appointment so that I can contact you if I have a family emergency, etc.</p>	
<u>WEB SITE</u>	<p>As will be explained in class, you must be able to obtain course information from the Internet. The University provides extensive computing facilities for this purpose. Additional information about required Web resources will be available on my website: https://www.ndsu.edu/pubweb/~braaten/index.html</p>	
<u>E-MAIL</u>	<p>You must be able to receive email messages sent by your instructor to your NDSU email address and respond appropriately to such email messages.</p>	
<u>PREREQUISITES</u>	<p>EE 206 students must have successfully completed with a C or better the following courses: Math 166. A Co-req of Math 129 is also required. If you don't meet these requirements, you must have permission from the ECE Department Chair.</p> <p>You must be familiar with integral calculus and be willing to learn the additional mathematics that the instructor will introduce in the course.</p>	

<u>ACKNOWLEDGMENT</u>	The instructor acknowledges his debt to Dr. Jacob Glower and numerous previous instructors in the department for the organization of this course and for permission to use their course materials. An outstanding resource is Bison Academy.
<u>DISABILITIES OR SPECIAL NEEDS</u>	Any students with disabilities or other special needs who need special accommodations in this course are encouraged to share these concerns or requests with the instructor as soon as possible so that appropriate arrangements for those accommodations can be made.
<u>INSTRUCTOR HELP</u>	Your instructor has designated office hours and is happy to help students who are trying, but still are having difficulties. Questions in class are valuable to all concerned, so don't be bashful.
<u>TEXTBOOK</u>	Electric Circuits by Nilsson and Riedel (2007 edition or later)
<u>READING ASSIGNMENTS</u>	This is a reading "budget" that will guide you through the first part of the textbook during the term. Be careful to stay on schedule.
<u>HONESTY</u>	<p>All work in this course must be completed in a manner consistent with NDSU University Senate Policy, Section 335: Code of Academic Responsibility and Conduct, which is available on the Web at: https://www.ndsu.edu/academichonesty/.</p> <p>Violation of this code will result in a penalty or penalties to be determined by the instructor to fit the gravity of the offense and the circumstances of the particular case. The instructor may: (1) fail the student for the particular assignment or test, (2) give the student a failing grade in the course, or (3) recommend that the student drop the course.</p> <p>As future engineers, please also consider the Preamble to the Engineering Code of Ethics from the National Society of Professional Engineers:</p> <p>"Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the highest standards of honesty and integrity. Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness, and equity, and must be dedicated to the protection of the public health, safety, and welfare. Engineers must perform under a standard of professional behavior that requires adherence to the highest principles of ethical conduct."</p> <p>See: http://www.nspe.org/Ethics/CodeofEthics/index.html .</p>
<u>PROBLEMS</u>	If you solve a homework problem using a computer program such as Matlab, please submit a hardcopy of the program and solution with your homework solution. If you use a procedure or program for a programmable calculator, you must submit a brief description of the procedure or program used with an indication of the model of calculator employed. Problems are to be worked on 8 1/2" X 11" engineering paper, on ONE SIDE ONLY. Usually it is helpful to draw a diagram of the given data for the problem. UNDERLINE all answers. SHOW ALL WORK. Give all equations before substituting numerical values into them and ALWAYS give the UNITS involved. <u>Please do not put any personal identification numbers on your homework or exams.</u>

<u>PROBLEM COLLECTION</u>	Your instructor will indicate the method of collecting homework problems, either by a written statement or orally.														
<u>COOPERATIVE LEARNING ACTIVITIES AND UNANNOUNCED QUIZZES</u>	In addition to traditional lectures, we might also have cooperative learning activities and occasional unannounced short quizzes. Quizzes and activities may involve the assigned reading or previous course work. Makeup work for such activities is possible at the discretion of the instructor, but is normally allowed only in the case of student illness or an equally serious reason.														
<u>ATTENDANCE</u>	Your attendance in class contributes to your own learning. Your active participation and enthusiasm for the course helps your classmates learn as well and encourages your instructor to do his best in the course. Your daily attendance and participation are sincerely appreciated by your instructor. Try not to miss any class. Thank you!														
<u>ABSENCES</u>	Credit will be given for all student work turned in late if due to a legitimate excuse and arranged for by the student. It is the STUDENT'S responsibility to contact the instructor and explain the circumstances. The student is responsible for all material discussed in class whether or not he or she was in class. The student should realize that material might be covered in class which is not discussed in the textbook or which may be discussed in a different manner than in the book. If you miss a lecture, it is your responsibility to obtain lecture notes from a classmate. The instructor does not loan out his lecture notes. <u>Late homework or projects are not accepted in this class. The only exception is student illness or a family emergency. The instructor will specify the due date in such cases. Even in those cases the absolute final deadline possible for submission is the official time of the final examination.</u> It is the student's responsibility to contact the instructor in such cases. If you are going to miss an examination because of illness or a family emergency, telephone your instructor before the exam or on the same day, if possible, to see about a makeup exam. If you are going to miss a scheduled quiz, test, or examination, for a good reason, telephone the instructor before the scheduled date or on the same day, if possible. If your absence is considered valid, a make-up will be scheduled.														
<u>COURSE GRADE</u>	<p>This course will consist of lectures, presentations, demonstrations, discussions, cooperative learning activities, and homework problems. Your grade will be based on the results of quizzes, tests, the final examination, unannounced quizzes, class participation, and a complete course notebook. The course grade will be determined on the following basis or as specified by the instructor in class.</p> <p>Grade determination:</p> <table data-bbox="600 1675 950 1911"> <tr> <td>Examination No. 1</td> <td>15%</td> </tr> <tr> <td>Examination No. 2</td> <td>15%</td> </tr> <tr> <td>Examination No. 3</td> <td>15%</td> </tr> <tr> <td>Final examination</td> <td>15%</td> </tr> <tr> <td>Laboratory work</td> <td>15%</td> </tr> <tr> <td>Quizzes</td> <td>15%</td> </tr> <tr> <td><u>Homework</u></td> <td>10%</td> </tr> </table>	Examination No. 1	15%	Examination No. 2	15%	Examination No. 3	15%	Final examination	15%	Laboratory work	15%	Quizzes	15%	<u>Homework</u>	10%
Examination No. 1	15%														
Examination No. 2	15%														
Examination No. 3	15%														
Final examination	15%														
Laboratory work	15%														
Quizzes	15%														
<u>Homework</u>	10%														

	<p style="text-align: center;"><i>Total</i> 100%</p> <p>If this grading policy has to be changed for some reason, this will be announced before the end of the second week of class. If some element of the course has to be cancelled for some unforeseen reason, its percentage points will be redistributed in proportion to the percentages associated with the other course elements. If for some unforeseen reason the course ends early, the grade will be based on your results to date.</p>
	<p>Quizzes, tests, and the final examination will cover: (1) all material presented in class by the instructor or by his designated substitute(s) including all class activities such as lectures, demonstrations, cooperative learning activities, videotapes, slides, and so forth; (2) reading assignments in the textbook; (3) information available at assigned Web sites; (3) homework; and (4) assigned library reserve materials. Unscheduled graded class activities are considered to be part of the next quiz, test, or examination.</p>
	<p>Letter grade assignment will be determined at the end of the semester by the instructor based on the student's overall course percentage. The minimum percentage necessary for each letter grade is as follows: A (90.0%), B (80.0%), C (70.0%), and D (60.0%). An "F" is associated with percentages below 60.0%.</p>
	<p>NOTICE that your grade is determined by you. To learn how to solve problems in circuits you must solve problems in circuits. This requires a constant effort throughout the term in reading the textbook, attending all lectures, studying lecture notes, working out homework problems, and reviewing your homework and tests. You cannot learn this material by just attending class and studying the night before a test. A thorough understanding of the material discussed in this course will benefit you throughout your career. To achieve this, a constant effort throughout the semester in reading the textbook and working homework problems is required.</p>
<u>ECE DEPARTMENT LAB POLICY</u>	<p>In all ECE courses with laboratory work</p> <ul style="list-style-type: none"> ▪ each student must perform each experiment, and ▪ each student must turn in a report for each experiment <p>in order to receive a passing grade in the course.</p>
<u>ADDITIONAL HELP</u>	<p>If you have questions about the way a particular assignment or test was graded, do not hesitate to discuss this with your instructor. However, to keep grading as fair as possible, this must be done within a few days after the test or assignment was returned to you. NO CHANGES will be made after that time.</p>
<u>MATERIALS NEEDED</u>	<p>Please use 8 1/2" by 11" engineering paper for your homework. If you are thinking of buying a new calculator, for future ECE courses you might find it useful to have one that uses complex numbers and complex hyperbolic functions directly and that inverts matrices of complex numbers.</p>
<u>ERRORS OR OMISSIONS</u>	<p>Please inform the instructor if you find errors in the syllabus or if you think an error was made in class. Your instructor is anxious to correct such mistakes. If necessary, a corrected syllabus will be distributed in class or posted on the Web.</p>

Course Topics (subject to change):

Introduction
PartSim, CircuitLab, and Matlab
Electric Quantities
Circuit Elements & Kirchoffs Laws
Resistors in Series and Parallel
Voltage and Current Division
Voltage Nodes
Super-Nodes
Current Loops (Meshes)
Super Loops (Meshes)
Review
Test #1
Thevenin and Norton Equivalents
More Thevenin Equivalents
Maximum Power Transfer
Superposition
Operational Amplifier
Inverting and Summing Amplifier
Non-Inverting and Difference Amplifier
Inductors and Capacitors
Mutual Inductance
Review
Test #2
The Sinusoidal Source
Complex Numbers
Phasors
Passive Circuit Elements
Series & Parallel with Phasors
Voltage Nodes with Phasors
Current Loops with Phasors
Op-Amps with Phasors
Superposition with Phasors
Superposition (take 2)
Fourier Transform
Superposition (take 3)
Review
Test #3
Natural Response: RL & RC
The p-Operator
Review
Final Exam – Please see NDSU’s web site for schedule