Boston University
Dresden Program
Electric Circuit Theory

ENG EK 307

Prerequisite: CLA PY 211 or CLA PY 251

Times: Lectures: twice a week @ 90 minutes each
Discussions: once a week @ 60 minutes

Labs: TBA

Lecturers: Lectures: Dr. A. Mögel

Discussions: DI T. Tyczynski

Lab: Dr. A. Mögel, Dr. J. Müller, DI T. Tyczynski

Text: **Alexander and Sadiku: Fundamentals of Electric Circuits, 3rd edition, McGraw-Hill, 2006**

References: Recommended for additional reading:

Dorf and Svoboda, Introduction to Electric Circuits, John Wiley & Sons
Thomas and Rosa, The Analysis and Design of Linear Circuits, Prentice Hall
Neudorfer and Hassul, Introduction to Circuit Analysis, Allyn and Bacon
Hayt and Kemmerly, Engineering Circuit Analysis, McGraw Hill
Simpson, Student Problem Set with Solutions, Prentice Hall
Johnson, Johnson and Hilburn, Student Problem Set with Solutions, Prentice Hall
Hayt and Kemmerly, Student Manual to Accompany Engineering Circuit Analysis, McGraw Hill
Schaum's 3000 Solved Problems in Electric Circuits, McGraw Hill

Exams: You will have one mid-term exam and a final exam. The exams are closed-book, closed-notes. **No formula sheets will be allowed.**

Quizzes: You will have five 20-minute in lecture quizzes distributed randomly over the course, based on recent lectures and homework material.

Homework: A homework set will be assigned weekly.

Problem Presentation: Every student will present solutions to problems selected from the homework material. The presentation will be graded.

Laboratories: To pass this course you must satisfactorily complete the Laboratory. There will be in-lab exams before each lab work. Labs are held in TOE 301, 3d floor of Toeplerbau, Mommsenstraße.

Discussion: Discussion classes begin the first week of classes.

Absences: Absences will hurt your progress and understanding. You are expected to attend every Lecture, Lab and Discussion session for which you are registered. You should not form other commitments conflicting with your EK 307 obligations. If you miss an Exam, Quiz, Homework, or Lab without a valid documented excuse, you will get zero points for that exercise. Only extreme circumstances will warrant an excused absence. In case of sickness, provide a doctor's note upon your first return to class. See your professor to discuss unusual circumstances.

Oversleeping, forgetfulness, inability to find the classroom, lack of preparation, heavy workloads in other courses, etc. are not valid reasons for missing an assignment. An early Final Exam will not be given to those booking air tickets for dates prior to the Exam. If you have a valid excuse, the following will apply:(1) you must make up a missed Midterm Exam, Final Exam or Lab, (2) a missing Quiz or Homework grade will be replaced by the average of your other Quiz or Homework grades.

I and W Grades: An I (Incomplete) grade will be given only in extreme circumstances in which most of the course has been completed and enforceable and uncontrollable circumstances prevent a student from completing the remaining requirements. A W (Withdrawal) grade will be given according to the University Calendar -- the professors will not backdate W forms.

Collaboration: All work done for credit must be your own! The Faculty, Teaching Fellows, and Teaching Assistants will not tolerate cheating of any kind. Collaboration is encouraged - engineers usually work collaboratively and learning improves if you work with others. Copying is not allowed.

Course information: Information or changes to this syllabus may be given during Lectures. If you miss a class, it is your responsibility to seek out this information.

Grading: Grade appeals must be made in writing, and accompanied by the disputed work. These must be submitted within one week.

Final Exam	**30%**	**0...30 points**
Mid Term Exam	**25%**	**0...25 points**
Quizzes	**20%**	**0...4 points each Quiz**
Laboratory	**25%**	**0...5 points each lab work**
Problem Presentation	**+ 3%**	**0...3 additional points**

Homework Assignments

Distribution: Homework will be assigned in every discussion class. The solutions will be discussed in the Talk one week later.

Quality of solutions: The homework solutions should be neat and well-organized. Each solution should clearly indicate the technique used and assumptions made.

Learning circuit theory: This is a problem-solving course emphasizing analysis, but also including design and evaluation. The importance of working out the homework problems yourself cannot be over-emphasized. Looking over other people's solutions is no substitute for working the problems on your own. If you don't do the problems, you won't learn circuit theory. You should work through all of the example problems as you read the text and read the unassigned problems at the end of each chapter to determine if you know how to approach their solutions.

Resources / Help: Reference books on reserve have many more worked problems. Teaching fellow and faculty office hours will be scheduled to offer help with homework. ENG tutoring services are also available. **Make use of all these resources!**

Class Schedule

Lec	Quiz	Topics	Text	Lab
1		1. Circuit Variable Introduction System of Units Circuit Analysis Charge and Current Kirchoff's Current Law Measuring Current	1.1 1.2 1.3 1.4 1.5 2.4 3.5	
2		Energy and Voltage Kirchhoff's Voltage Law Measuring Voltage Power and Energy Measuring Power	1.4 2.4 3.5 1.6	
3	1	2. Circuit Elements Electrical Resistance and Conductance Voltage and Current Sources Dependent Sources	2.5 2.2 2.1 2.5	
4		Resistors in Series, Voltage Divider Resistors in Parallel , Current Divider	3.1, 3.3 3.2, 3.4	
5		Circuit Analysis Terminology Node-Voltage Method	4.1 4.2, 4.3, 4.4	
6	2	Mesh -Currents Method Node-Voltage versus Mesh-Current	4.5, 4.6, 4.7 4.8	
7		Source Transformations Thevenin and Norton Equivalent	4.9 4.10, 4.11	I/1 Electrical Measurements
8	3	Maximum Power Transfer Superposition	4.12 4.13	
Lect	Quiz	Topic	Chapter	Lab

9		Operational Amplifier Terminals Terminal Voltages and Currents The Inverting-Amplifier Circuit	5.1 5.2 5.3	
10	4	The Summing-Amplifier Circuit The Noninverting-Amplifier Circuit	5.4 5.5	
11		Mid Term Exam		I/2 Linear Resistive Circuits
12		The Inductor. The Capacitor		
13	5	Series-Parallel Combinations of Inductance and Capacitance Mutual Inductance	6.1 6.2	
14		The Natural Response of RL circuit The Natural Response of RC Circuit	6.3 6.4	I/3 Nonlinear Resistive Circuits
15	6	The Step Response A General Solution The Integrating Amplifier	7.1 7.2	
16		Parallel RLC Circuit Natural Response	7.3 7.4 7.7	
17	7	Step Response Series RLC Circuit	8.1 8.2 8.3 8.4	
18		The Sinusoidal Source The Sinusoidal Response The Phasor Passive Elements	9.1 9.2 9.3 9.4	II/1 Step and Natural Responses

Lec	Quiz	Topic	Chapter	Lab
19	8	Kirchhoff's Laws in Frequency Domain Series and Parallel Simplifications	9.5 9.6	
20		Sources Transformations & Thevenin-Norton Circuits. The Node-Voltage Method The Mesh-Current Method	9.7 9.8 9.9	
21		The Transformer The Ideal Transformer	9.10 9.11	
22		Instantaneous Power Average & Reactive Power RMS & Power Calculations Maximum Power Transfer	10.1 10.2 10.3 10.6	II/5 Frequency Responses
23	9	Preliminaries of Frequency Selective Circuits Low-Pass Filters & High-Pass Filters	14.1 14.2, 14.3	
24	10	Band-Pass Filters Bandreject Filters	14.4 14.5	
25		Bode Diagrams First-Order Low-Pass and High-Pass Filters OP Amp Bandpass and Bandreject Filters	14.6 15.1 15.3	
26		Final Exam		