Boston University
Dresden Program
Electric Circuit Theory

ENG EK 307 **Spring 2014**

Prerequisite: CLA PY 211 or CLA PY 251

Lecturers:

Lectures: Prof. W. Schwarz	Tuesday	9.20 – 10.50, BZW B101,
	Wednesday	9.20 – 10.50, HSZ E05
Discussions: Dr. A. Mögel	Wednesday	11.40 – 12.40, HÜL S188
	Wednesday	13.00 – 14.00, HÜL S188
Prelab Lectures: Dr. A. Mögel	Wednesday	17.30 – 18.30, BAR 213
Lab: Dr. A. Mögel, DI Jens Müller, DI Tang Tang		(Friday 10.00 – 13.00 TOE 301)

Text: **Thomas R. E. et al.: The Analysis And Design Of Linear Circuits, 7th edition, Jon Wiley & Sons Inc., 2012**

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: The reference books above have many more worked problems. Individual or group appointments with the lecturers can be made to answer questions and to help with solving problems. **Make use of all these resources!**

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Class/Exam/Lab Schedule

Lecture	**Topics**	**Disc** Groups 1 and 2 1: 11.40 – 12.40 2: 13.00 – 14.00	**Lab** Groups A, B and C 10.00 – 13.00
Tu Apr 8 1	1 Circuit Variables 1.1 Quantities and Units 1.2 Computing with Physical Quantities 1.3 Charge and Current	W Apr 9 disc 1 **Prelab 1** 17.30 – 18.30	F Apr 11 09.20 – 10.50 BAR 213 lecture 3: **Quiz 1** 2 Circuit Elements 2.1 Two Terminal Devices (One Ports) 2.2 Dependent Sources
W Apr 9 2	1.4 Voltage 1.5 Power and Energy		
Tu Apr 15 4	3 Simple Resistive Circuits 3.1 Resistors in Series 3.2 Voltage Divider Circuit 3.3 Resistors in Parallel 3.4 Current Divider Circuit 3.5 Series-Parallel Connection 3.6 Wye-Delta Transformations 3.7 Complex Circuits	W Apr 16 disc 2 **Prelab 2** 17.30 – 18.30	F Apr 18 Good Friday – no lab
W Apr 16 5	4 Circuit Analysis 4.1 Superposition 4.2 Source Transformations		
Tu Apr 22 6	4.3 Graphical Analysis 4.4 Piecewise Linear Circuits	W Apr 23 – no disk	F Apr 25 A1, B-, C2 (Groups A: Lab 1, Groups B: no lab Groups C: Lab 2)
W Apr 23 7	**Quiz 2** 4.5 Power Transfer 4.6 Terminology for Describing a Circuit		
Tu Apr 29	disc 3	W Apr 30 disc 5	F May 2 – no lab
W Apr 30	disc 4		
Tu May 6 8	4.7 Simultaneous Equations – How Many? 4.8 Mesh-Current Method	W May 7 disc 6 **Prelab 3** 17.30 – 18.30	F May 9 A2, B1, C-
W May 7 9	4.9 Node-Voltage Method		
Tu May 13 10	**Quiz 3** 5 Capacitors and Inductors 5.1 The Capacitor 5.2 The Inductor	W May 14 disc 7 **Prelab 4** 17.30 – 18.30	F May 16 09.20 – 10.50 BAR 213 lecture 12: 6.2 The Natural Response of an RC Circuit 6.3 The Step Response of an RL Circuit 6.4 The Step Response of an RC Circuit
W May 14 11	6 Response of First-Order Circuits 6.1 The Natural Response of an RL Circuit		

Tu May 20 13	**Mid Term Exam**	W May 21 dies dies academicus – no disc	F May 23 A-, B2, C1
W May 21	dies academicus – no lecture		
Tu May 27 14	6.5 A General Solution	W May 28 disc 8 **Prelab 5** 17.30 – 18.30	F May 30 – no lab
W May 28 15	7 Sinusoids and Phasors 7.1 Time-varying Quantities 7.2 The Sinusoidal Signal		
Tu Jun 3 16	7.3 The Sinusoidal Response	W Jun 4 disc 9	F Jun 6 A3, B5, C4
W Jun 4 17	7.4 The Phasor 7.5 Impedance and Admittance		
Tu Jun 10	Whit Monday – no lecture	W Jun 11 – no disc	F Jun 13 – no lab
W Jun 11	– no lecture		
Tu Jun 17 18	**Quiz 4** 8 Sinusoidal Steady-State Analysis 8.1 Procedure	W Jun 18 disc 10	F Jun 20 A4, B3, C5
W Jun 18 19	8.2 Superposition 8.3 Source Transformations 8.4 Node-Voltage Method		
Tu Jun 24 20	**Quiz 5** 9 Magnetically Coupled Circuits 9.1 Mutual Inductance 9.2 Linear Transformers 9.3 Ideal Transformers	W Jun 25 disc 11	F Jun 27 – no lab
W Jun 25 21	10 Frequency Response 10.1 Transfer Function 10.2 First Order Filters		
Tu Jul 1 22	10.3 Series Resonant Circuit	W Jul 2 disc 12	F Jul 4 A5, B4, C3
W Jul 2 23	10.4 Parallel Resonant Circuit 10.5 Other Higher Order Filters		
Tu Jul 8 24	11 Operational Amplifiers 11.1 Characteristics 11.2 Basic Amplifier Circuits	W Jul 9 disc 13	F Jul 11 – no lab
W Jul 9 25	11.3 Applications 11.4 Active Filters		
Tu Jul 15 26	Summary, Exam Preparation	W Jul 16	F Jul 18 – no lab
W Jul 16 27	(lecture 27, disc 14) **Final Exam** 08.20 – 10.50 Hül S184		