Boston University Dresden Program
Electric Circuit Theory ENG EK 307

Prerequisite: CAS PY 211 or CAS PY 251

Instructors: Prof. Dr. Wolfgang Schwarz, Dr. Andreas Mögel, et al.
TU Dresden

Lectures: Twice a week at 90 minutes each
Discussions: Split in 2 Groups at 60 minutes once a week
Pre-Labs and Labs: 5 Pre-labs and 5 Labs per semester

Text: Charles K. Alexander, Matthew N. O. Sadiku: Fundamentals of Electric Circuits. 5th edition,
McGraw-Hill, 2013

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.

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:

Grading:
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.
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**
Points	**Grade**	

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!**

Lecture Chronology

Lecture	Topics
1	1 Circuit Variables 1.1 Quantities and Units 1.2 Computing with Physical Quantities 1.3 Charge and Current
2	1.4 Voltage 1.5 Power and Energy
3	**Quiz 1** 2 Circuit Elements 2.1 Two Terminal Devices (One Ports) 2.2 Dependent Sources
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
5	4 Circuit Analysis 4.1 Superposition 4.2 Source Transformations
6	4.3 Graphical Analysis 4.4 Piecewise Linear Circuits
7	**Quiz 2** 4.5 Power Transfer 4.6 Terminology for Describing a Circuit
8	4.7 Simultaneous Equations – How Many? 4.8 Mesh-Current Method
9	4.9 Node-Voltage Method
10	**Quiz 3** 5 Capacitors and Inductors 5.1 The Capacitor 5.2 The Inductor
11	6 Response of First-Order Circuits 6.1 The Natural Response of an RL Circuit

13	**Mid Term Exam**
14	6.5 A General Solution
15	7 Sinusoids and Phasors 7.1 Time-varying Quantities 7.2 The Sinusoidal Signal
16	7.3 The Sinusoidal Response
17	7.4 The Phasor 7.5 Impedance and Admittance
18	**Quiz 4** 8 Sinusoidal Steady-State Analysis 8.1 Procedure
19	8.2 Superposition 8.3 Source Transformations 8.4 Node-Voltage Method
20	**Quiz 5** 9 Magnetically Coupled Circuits 9.1 Mutual Inductance 9.2 Linear Transformers 9.3 Ideal Transformers
21	10 Frequency Response 10.1 Transfer Function 10.2 First Order Filters
22	10.3 Series Resonant Circuit
23	10.4 Parallel Resonant Circuit 10.5 Other Higher Order Filters
24	11 Operational Amplifiers 11.1 Characteristics 11.2 Basic Amplifier Circuits
25	11.3 Applications 11.4 Active Filters
26	Summary, Exam Preparation
27	(lecture 27, disc 14) **Final Exam**