



LTH

FACULTY OF
ENGINEERING

Course syllabus

Elektronik Electronics

EITA35, 15 credits, G1 (First Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED E

Date of Decision: 2023-04-11

General Information

Main field: Technology.

Compulsory for: E1

Language of instruction: The course will be given in Swedish

Aim

The aim is to give a firm base for continued studies in electronics. The student should have an understanding of, and be able to prove knowledge in, the internal design of different building blocks like the schematic, components, sources and loads. The student should also have gained skills and understanding of basic circuit theory, and the representation and processing of signals in time and frequency domains.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- Be able to explain the meaning of basic concepts and expressions within the field of circuit theory, how signals are processed in time and frequency domain, and be able to present this, based on measurements and analysis of an elementary circuit.

Competences and skills

For a passing grade the student must

- Be able to calculate voltages, currents and dissipated power in an arbitrary circuit containing sources, resistors and reactive components.
- For a given set of input and output signals, be able to choose and design an amplifier circuit using operational amplifiers.

- Show skills in practical laboratory work and have the ability to do systematic trouble shooting.

Judgement and approach

For a passing grade the student must

- Be able to write a high quality technical report
- Be able to read and understand journal articles in the field of electronics.

Contents

- Topics covered in the course are: Analogue and sampled signals. Signals treated in time and frequency domains. Input/output relations. Transfer functions.
- Analysis of electrical circuits: Current, voltage, current sources, voltage sources, resistors, Kirchhoff's laws, nodal analysis, two-pole equivalents, capacitors, inductors, non-linear components, impedance, admittance, alternating current, the time and frequency dependence of circuits, and feedback. Transformers.
- Measurement technique: the function generator, the oscilloscope and the multimeter.
- Applications: Signal- and power-matching. Amplifiers, analogue to digital conversion, simple power supply, simple analogue filters and Bode diagrams.
- There are lectures with invited lecturers that cover the use of electronics in modern society.
- The laboratory work is presented in a report where understanding and general analysis are distinguishable entities. The results from one of the labs are given as an oral presentation. The project report is evaluated both from a technical and a linguistic point of view.
- The student is asked to write a brief reflection on the education.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)

Assessment: Examination consists of laboratory work, reports, project work and two written exams. There are two possibilities for re-exam of written exam part 1 and part 2 but the laboratory work and lectures are only given once a year. The grade is set by the truncated mean value of the results of part 1 and part 2.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Parts

Code: 0118. **Name:** Examination 1.

Credits: 3. **Grading scale:** TH. **Assessment:** Written exam. **Contents:** Basic circuit theory and AC-circuits.

Code: 0218. **Name:** Examination 2.

Credits: 4,5. **Grading scale:** TH. **Assessment:** Written exam. **Contents:** The whole curriculum but mainly systems built with operational amplifiers. Digital components.

Code: 0318. **Name:** Project.

Credits: 3. **Grading scale:** UG. **Assessment:** Written report. **Contents:** General knowledge and over-all view of electrical systems. Project work and writing a report. **Further information:** The project is only given once a year.

Code: 0418. **Name:** Laboratory Work.

Credits: 4,5. **Grading scale:** UG. **Assessment:** Passed laboratory work and written reports. **Contents:** Laboratory work.

Admission

The number of participants is limited to: No

The course overlaps following course/s: ETE022, ETE115, ETI195, ETI196, ETIA01, ESS010

Reading list

- Hambley, A: Electrical Engineering, Principles and Applications. Pearson , 2018, ISBN: 9781292223124. 7th edition.
- Elektro och informationsteknik: Kretsteori, Exempelsamling. 2021.
- Karlsson och Larsson: Elektronik Laborationer. 2021.
- Labkit (free of charge for course participants).

Contact and other information

Course coordinator: Mattias Borg, mattias.borg@eit.lth.se

Course homepage: <http://www.eit.lth.se/course/eita35>