

## Electronics (E610055)

**Course size** *(nominal values; actual values may depend on programme)*

**Credits 3.0**                      **Study time 90 h**

**Course offerings and teaching methods in academic year 2023-2024**

A (semester 2)	Dutch	Kortrijk	lecture
			practical

**Lecturers in academic year 2023-2024**

Willems, Brecht	TW06	staff member
Lemey, Sam	TW05	lecturer-in-charge

**Offered in the following programmes in 2023-2024**

	<b>crdts</b>	<b>offering</b>
<a href="#">Bachelor of Science in Engineering Technology(main subject Machine and Production Automation)</a>	3	A
<a href="#">Bachelor of Science in Bioindustrial Sciences</a>	3	A
<a href="#">Bachelor of Science in Industrial Design Engineering Technology</a>	3	A
<a href="#">Bachelor of Science in Engineering Technology (Joint Section)</a>	3	A
<a href="#">Linking Course Master of Science in Industrial Design Engineering Technology</a>	3	A

**Teaching languages**

Dutch

**Keywords**

Semiconductor technology, diodes, bipolar transistors, field-effect transistors, diode circuits, transistor circuits

**Position of the course**

The course has the following objectives:

- Acquire basic knowledge in the field of electronics and gain insight in its recent developments.
- Be able to describe and to analyse diverse electronic systems and their components in the domain of everyday electronics.
- During the practicum sessions, theoretical principles are practiced and realistic electronic circuits are calculated. The obtained results are compared with simulations and, if possible, with practical measurements. Operational and non-operational circuits are examined by means of datasheets to analyse and prevent errors.

**Contents**

- Introduction: history, important quantities, basic components
- Semiconductor technology: the atom model, N-type and P-type semiconductors, the PN-junction
- Diodes and applications: diode operation, voltage-current characteristic, diode models, rectifier circuits and other applications
- Special-purpose diodes: Zener, varactor, optical diode
- Bipolar Junction Transistors: basic BJT operation, characteristics and parameters, the BJT as amplifier, the BJT as switch, phototransistor
- Transistor circuits: DC operating point, bias methods, common-emitter amplifier, common-collector amplifier, common-base amplifier
- Field-Effect Transistors: JFET characteristics and parameters, MOSFET characteristics and parameters

**Initial competences**

Builds upon certain final competences of the course 'Electricity'.

### **Final competences**

- 1 Recognise and analyse electronic systems.
- 2 Explain the operation principles of electronic semiconductor components, such as the diode and the transistor.
- 3 Explain the operation of basic diode and transistor circuits.
- 4 Be able to independently analyse a basic electronic system.

### **Conditions for credit contract**

Access to this course unit via a credit contract is determined after successful competences assessment

### **Conditions for exam contract**

This course unit cannot be taken via an exam contract

### **Teaching methods**

Lecture, Practical

### **Extra information on the teaching methods**

Lecture 18.0u, Practicum 12.0u

### **Learning materials and price**

- English textbook: Electronic devices (price ca. 80 EUR, conventional current version, Global edition, Thomas L. Floyd, 10th edition (ISBN-13: 978-1-29-222299-8))
- Hand-outs of the slides and additional documentation are available on the electronic learning environment.

### **References**

### **Course content-related study coaching**

The lecturers are available for further information via various channels (during and/or after the course or by appointment).

### **Assessment moments**

end-of-term and continuous assessment

### **Examination methods in case of periodic assessment during the first examination period**

Written assessment

### **Examination methods in case of periodic assessment during the second examination period**

Written assessment

### **Examination methods in case of permanent assessment**

Written assessment, Assignment

### **Possibilities of retake in case of permanent assessment**

examination during the second examination period is possible in modified form

### **Extra information on the examination methods**

PE1 and PE2: Written examination

NPE: The practicum sessions are examined by means of a report and a written exam based on the lab content (outside the examination period).

### **Calculation of the examination mark**

- Final score ( $/20$ ) =  $2/3$  theory +  $1/3$  practicum
- 2 illegitimate absences during practicum sessions will result in a score AFW (Not Present) as a final mark.
- First and second examination period: to pass the course, at least  $7/20$  for Theory and Practicum has to be obtained. If this condition is not met, there will be a modification of the calculated number to  $9/20$ , if it is 10 or more.
- For the practicum, only 40% can be retaken in the second examination.