Module title	SM Code
Fundamental of Electrical Engineering 1.1	**GE1.1**

Module lecturer	Faculty	
Prof. Dr. Anton Horn	Electrical Engineering and Information Technology	

Module language	Number of SWS / WSH	ETCS credits
English	4 SWS / WSH	4

Teaching format
Seminar-based teaching with 10 - 15% practical component

Semester according to the study plan
1st semester (Bachelor)

Attendance/classroom hours	Additional independent study
56 hours	Preparation and follow-up work: 40 hours Exam preparation: 24 hours

Type of examination / Requirements for the award of the credit points
Written exam: 60 minutes

Teaching content

Direct current

- Basic concepts of electrical circuits: current, current density, energy, voltage and potential, power loss, efficiency, electrical heat

- Two-pole circuits (active and passive, linear and nonlinear), Ohm's law, electrical resistance and its temperature dependence

- Calculation of direct current networks: application of Kirchhoff's laws (current and voltage dividers), active and passive equivalent two-pole circuits, (two-pole theory, analytical and graphical), superposition method, node voltage and mesh current methods

Learning objective: Professional competence

After successfully completing this module, students will be able to

- understand the basic concepts and physical laws of direct current circuits (Kirschhoff's laws) (1)

- apply the knowledge they have acquired to solve known types of problems in the field of direct current networks (2); Calculating voltages, currents, and power in an electrical network with multiple sources and non-linear resistances using analytical and graphical methods

- solve previously unknown problems in the field of direct current networks with an understanding of the underlying laws of physic (3)

Literature

Recommended reading

- Hambley, A. R. (2018). *Electrical Engineering Principles and Applications*. Pearson

- Dorf, R. C., & Svoboda, J. A. (2010). *Introduction to Electric Circuits*. John Wiley & Sons

- Alexander, C. K., & Sadiku, M. N. O. (2021). *Fundamental of Electrical Circuits*. McGraw-Hill

- Floyd, T. L. (2022). *Principles of Electric Circuits: Conventional Current Version*. Pearson

- Hayt, W. H., & Buck, J. A. (2011). *Electromagnetic Fields and Waves*. McGraw-Hill

The numbers in brackets indicate the levels to be achieved: (1)-know | (2)-can | (3)-understand and apply