

Module title		SM Code
Electrical Engineering 1.2		GE1.2
Module lecturer		Faculty
Prof. Dr. Heiko Unold	Electrical Engineering and Information Technology	
Module language	Number of SWS / WSH	ETCS credits
English	4 SWS / WSH	5
Teaching format		
Seminar-based teaching with 10-15% practical component		

Semester according to the study plan	
2 nd semester (Bachelor)	
Attendance/classroom hours	Additional independent study
56 hours	Preparation and follow-up work: 58 hours Exam preparation: 36 hours
Type of examination / Requirements for the award of the credit points	
Written exam: 90 minutes	

Teaching content
Stationary magnetic field
<ul style="list-style-type: none"> Basic concepts of magnetic fields: source freedom, superposition principle, magnetic flux density and (linked) flux, permeability, magnetic field strength, magnetic dipole moment Calculation of magnetic fields of coils and conductors using the law of flux and Biot-Savart's law, energy and forces of the magnetic field Matter in magnetic fields and behavior of fields at interfaces Calculation of magnetic circuits

Unsteady magnetic field

- Law of induction
- Inductance of coils and conductors
- Magnetically coupled coils
- Mutual inductance
- Coupling factors
- Switching processes in circuits with inductances

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 (Kirchhoff's laws) (1)
- apply the knowledge they have acquired to solve known types of problems in the field of magnetic fields (2):
calculation of magnetic fields and the inductance of simple current curves, calculation of (un)branched magnetic circuits for given material characteristics
- solve previously unknown problems in the field of magnetic fields with an understanding of the underlying physical laws (3)

Literature**Recommended reading**

- Ida, N. (2013). *Engineering Electromagnetics*. Springer
- Hayt, W. H., & Buck, J. A. (2012). *Engineering Electromagnetics*. McGraw-Hill

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