Electrical and Electromagnetic Methods of Applied Geophysics

Type of Module	Module Code
Basic Module	BM-GEOEEM

Identification Number	Workload	Credit Points	Term	Offered Every	Start	Duration
MN-GM-GEOEEM	180 h	6 CP	1. – 3. Semester	WiSe	Winter Term Only	1 Semester

1	Course Types	Contact Time	Private Study	Planned Group Size
	a) Lectures	45 h	45 h	30
	b) Exercise	30 h	60 h	

2 Aims of the module and acquired skills

- Knowledge of the principles of electromagnetic methods and overview of their applications
- Theory of electromagnetic methods, data analysis and modeling of DC-resistivity and electromagnetic data in frequency and time domain
- Ability to analyse electromagnetic data and to model them with multidimensional conductivity models

3 Contents of the module

- DC methods: basic equations, potential of the single electrode, solution of the Laplace equation for 1D earth, inversion of DC data, 1D and 2D forward modelling of DC data
- Electromagnetic induction: basic equations, induction in 1D earth, 2D conductivity models, field measurements and data analysis, quantitative interpretation, passive EM methods, active EM methods (Magnetotelluric and Geomagnetic Deep Soundings, Time Domain Methods)

4 Teaching Methods

Lectures and tutorials (compulsory attendance in the tutorials)

5 Prerequisites (for the Module)

Formal: None
Knowledge of basics of mathematics, physics and applied geophysics is strongly advised.

6 Type of Examination

Written examination (graded).

7 Credits Awarded

Successful participation in the exercises (50 % of the possible points have to be obtained) and passing of the examination.

8 Compatibility with other Curricula

• Other modules of equal value can be admitted and announced by the examination board after agreement.
• Suitable as an elective course for mathematics, physics and geoscience students

9 Proportion of Final Grade

6/114

10	**Module Coordinator** B. Tezkan
11	**Further Information** **Recommended Literature:** W.E. Telford et. al., Applied Geophysics, Cambridge University Press, 1990. O. Koefed, Geosounding principles, Vol. 1, Springer Verlag, 1985. Nabighian, M.N., Electromagnetic soundings in applied geophysics, SEG,1987. Simpson and Bahr, Practical magnetotellurics, Cambridge University Press, 2005. M.S. Zhadanov and G.V. Keller, The geoelectrical methods in applied geophysics, SEG, 1987. B. Buttkus, Spektralanalyse und Filtertheorie in der Angewandten Geophysik , Springer Verlag, 1991. D. S. Parasanis, Principles of Aplied Geophysics, Halsted Press Book, 1979.