## An Introduction to Geostatistics

<table>
<thead>
<tr>
<th>Module-No./Abbreviation</th>
<th>Credits</th>
<th>Workload</th>
<th>Term</th>
<th>Frequency</th>
<th>Duration</th>
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<tbody>
<tr>
<td>CE-W09/IGS</td>
<td>3 CP</td>
<td>90 h</td>
<td>3rd Sem.</td>
<td>Winter term</td>
<td>1 Semester</td>
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### Courses
- An Introduction to Geostatistics

<table>
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<tr>
<th>Contact hours</th>
<th>Self-Study</th>
<th>Group Size:</th>
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<tr>
<td>2 SWS (30 h)</td>
<td>60 h</td>
<td>No Restrictions</td>
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### Prerequisites
Fundamental knowledge of statistics and geotechnics

### Learning goals / Competences:
In this module, students get familiar with the context of uncertainty in the multivariate spatial analysis required for geosciences. Theoretical aspects of processing, evaluation, and analysis of random spatial data and practical implementation are presented.

After successfully completing the module, the students
- will have a basic understanding of geostatistical methods as well as spatial interpolation methods needed to solve typical engineering geostatistical problems,
- can evaluate geostatistical problems and select appropriate mathematical methods and corresponding software to provide solutions that are both efficient and practical,
- can determine the type of geostatistical problem (stochastic or deterministic, analytic or numerical, range of randomness, etc.) and convey their knowledge to other engineers and workers,
- will be able to present their solutions of geostatistical problems to expert co-workers as well as clients and explain the significance of their solutions in an adequate manner.

### Content
- Terminology and basics of geostatistics
- Spatial interpolation methods (deterministic and geostatistical methods)
- Mathematical techniques for modeling spatial variability (random field theory)
- Stochastic and deterministic processes to optimize monitoring design
- Possible applications and limits of geostatistical software

### Teaching methods / Language
Lecture (2h / week) / English

### Mode of assessment
Oral examination – Final project (30 min) / Final project will apply the gained knowledge during the lecture into a practical dataset (45 h)

### Requirement for the award of credit points
Passed final project and oral examination

### Module applicability
MSc. Computational Engineering

### Weight of the mark for the final score
- 

### Module coordinator and lecturer(s)
Prof. Dr.-Ing. M. König, Dr.-Ing. E. Mahmoudi, Assistants

### Further information