

Digital Rock Physics					
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Module number SE-O-7	Credits 5 CP	Workload 150 h	Semester[s] 2. Sem.	Duration 1 Semester[s]	Group size 20
Courses a) Digital Rock Physics			Contact hours a) 3 WLH (45 h)	Self-study a) 105 h	Frequency a) each summer
Module coordinator and lecturer(s) Prof. Dr. Erik Saenger a) Prof. Dr. Erik Saenger					
Admission requirements					
Learning outcome, core skills <p>The students will learn the fundamentals of digital rock physics. This broad range of knowledge will be taught with a special emphasis on geothermal and hydrocarbon exploration.</p> <p>After successful completion of this module, the students will:</p> <ul style="list-style-type: none"> • know the fundamentals of digital rock physics: <ul style="list-style-type: none"> - e.g. use of high-performance computer systems - e.g. understand the resolution limits of CT devices • be able apply the fundamentals of digital rock physics: <ul style="list-style-type: none"> - to predict effective material properties - to improve digital images with respect to the real rock • be able to apply the fundamentals of digital rock physics to scientific projects: <ul style="list-style-type: none"> - to upscale elastic properties to understand field scale observations - to interpret uncertainties in the digital rock physics workflow 					
Contents a) <ul style="list-style-type: none"> • The basics of the digital rock physics workflow will be introduced: CT-imaging, reconstruction, segmentation, calculation of physical properties. • The basics of parallel computing on high-performance computer systems will be introduced. • The basics of finite-different-schemes to solve the elastodynamic wave equation will be introduced. • The parallel computer program "Heidimod" to model elastic waves in highly heterogeneous and anisotropic media will be introduced in detail and will be applied to problems in the field of digital rock physics 					
Educational form / Language a) Tutorial (2 WLH) / Lecture (1 WLH) / English / German					
Examination methods • Term paper 'Digital Rock Physics' (30 h., Part of modul grade 100 %)					
Requirements for the award of credit points final report on computer exercises					
Module applicability <ul style="list-style-type: none"> • M.Sc. Subsurface Engineering 					

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- M.Sc. Geosciences

Weight of the mark for the final score

Percentage of total grade [%] = $5 * 100 * \text{FAK} / \text{DIV}$

FAK: The weighting factors can be taken from the table of contents.

DIV: The values can be taken from the table of contents.

Further Information
