

Fundamentals of Rock Physics

GEOP 501 Lecture Series by

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Time: 3:30-4:45 PM

Date: December 9, 11, 16, 18, 23, 25

Venue: ESD PC Lab (3-108)

Outline

1. **What is rock physics?**
2. **Rock physics / petrophysics: What's the difference?**
3. **Basic parameters**
 - a. Porosity
 - b. Density
 - c. Permeability
 - d. Mineralogy
4. **Elastic properties (velocities and moduli)**
 - a. Compressional wave velocity
 - b. Shear wave velocity
 - c. Bulk modulus
 - d. Shear modulus
 - e. Poisson's ratio
 - f. Young's modulus
5. **Factors affecting elastic properties**
 - a. Lithology
 - b. Porosity
 - c. Pore type
 - d. Saturation
 - e. Pressure
6. **Rock physics models and bounds**
 - a. Overview
 - b. Voigt-Reuss bounds
 - c. Hashin-Shtrikman bounds
 - d. Granular medium models
 - e. Inclusion models
7. **Gassmann's fluid substitution model**
 - a. Assumptions
 - b. Solid rock builder
 - c. Fluid properties
8. **Experimental rock physics**
 - a. Dynamic elastic properties
 - b. Static elastic properties