GEOL 7324 Rock Physics Syllabus

Dr. John Castagna

October 21, 22 & 28

Badge 1: Introduction and Rock Properties


Test 1

October 29 & November 4

Badge 2: Rock Mechanics and Velocity


Test 2

November 5 & 11


Vp/Vs and Poisson’s ratio, Vp-Vs relationships, Mudrock trend and Greenberg-Castagna relations, dry sandstones, brine-saturated rocks, shear-wave velocity versus porosity, mixed lithologies, gas-oil-brine fluid moduli and densities versus composition and TP conditions, Phase diagrams, Wood’s equation, effect of free gas on seismic velocity, Gassmann’s equations, Biot coefficient, fluid substitution, frame moduli, patchy saturation model, empirical fluid substitution, fizz water, inferences from Gassmann, Biot theory, fluid distribution, effect of dispersion on frame moduli estimation, applications in DHI analysis, stochastic fluid substitution, composite media models, mixing models, Backus average, Hashin-Shtrikman bounds, Kuster-Toksoz model, Porosity explicit versus porosity implicit empirical models, shear-wave velocity prediction, composite media modeling, crack density versus aspect ratio, attenuation, dispersion, spectral ratios, chimneys, velocity versus saturation and frequency, body-wave dispersion curves, squirt and Biot flow, ultrasonic velocity versus saturation, effective fluid modulus, segregated saturation, effect of disconnected porosity, homogenous versus segregated pore fluid distribution.

Test 3