ACOUSTICS 204

Instructor: Michael Buckingham

Spring Quarter 2015, Tuesdays & Thursdays, 12.00 – 1.20 pm,

Conference Room 440 Spiess Hall

Basic mathematics

Generalized functions (delta function, step function)

Linear systems (impulse response, system function)

Integral transforms (Fourier, Hankel)

Contour integration

Integrals with rapidly varying integrands (stationary phase)

Nyquist sampling theorem

Wave equations

Acoustic field from a point source

Acoustic field in a viscous fluid (Stokes' equation)

Complex sound speed

Dispersion and attenuation

Causality and Kramers-Kronig dispersion relations

Ideal waveguide

Normal modes

Plane wave representation of the field

Wave solution (using integral transforms)

Reflection from a fluid-fluid boundary

Rayleigh reflection coefficient

Weston's "effective depth" approximation

Pekeris waveguide

"Effective depth" representation

Normal modes

Solution for modal field

Ambient noise

Plane wave noise fields

Spatial coherence (isotropic noise)

Spatial coherence (symmetrical and anti-symmetrical noise fields)

Spatial coherence from vertical directionality

Green's function from ambient noise

Acoustic arrays

Directivity index

Array gain

Noise gain

Wave propagation in marine sediments

Experimental data (compressional and shear waves)

Biot theory

Grain-Shearing theory

Moving sources

Doppler frequency shifts

Field from a moving source