ACOUSTICS 204

Instructor: Michael Buckingham

Winter Quarter, Tuesdays & Thursdays, 1.00 – 2.20 pm, Rm 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)

Wave equations

- Field from a point source
- Field in a viscous fluid
- Complex sound speed
- Dispersion and attenuation
- Causality and Kramers-Kronig dispersion relations

Ideal waveguide

- Normal modes
- Plane wave representation
- Wave solution (integral transforms)

Plane-wave 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

**Wave propagation in marine sediments**
- Experimental data (compressional and shear waves)
- Biot theory
- Grain-Shearing theory

**Acoustic arrays**
- Directivity index
- Array gain
- Noise gain

**Moving sources**
- Doppler frequency shifts
- Field from a moving source