

ErSE 390 - Seismic waves



Seismic waves

Spring Semester 2020

- Lectures:**
- This class will be given as a **full semester course**
 - Language of instruction: **English**
 - **Wed/Thu, 9:00 – 10:30**
 - **Lecture material** available

Objectives:

Students will learn the theoretical and computational fundamentals of global seismic wave propagation. Major concepts about body and surface waves, as well as normal modes are introduced. Connections to imaging Earth 3D structure with ray-based methods, and methods beyond ray-theory are shown. Wave propagation phenomena such as attenuation, scattering and ambient noise are presented and studied by hands-on exercises.

After taking this course, students will have the background knowledge necessary to start an original research project in global seismology.

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Student work:

Reading/Hands-on exercises and reports

Requirements:

- Attendance (highly recommended)
- Grades will be given as follow:
 - 60% quiz(zes)
 - 40% Homework/Assignments



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Schedule: *(tentative)*

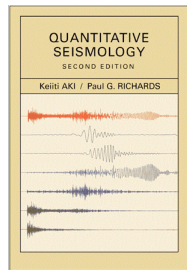
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|---------------|--|
| week 1: 29/01 | Introduction, History of seismology |
| week 2: 05/02 | Betty's theorem and representation theorem |
| week 3: 12/02 | Body waves |
| week 4: 19/02 | Surface waves |
| week 5: 26/02 | Normal modes |
| week 6: 05/03 | Seismic sources |
| week 7: 11/03 | Ray theory |
| week 8: 18/03 | Finite frequency seismology |
| week 9: 25/03 | Attenuation |
| week10: 01/04 | Scattering |
| week11: 08/04 | Diffuse wavefields |
| week12: 15/04 | Ambient noise |
| week13: 22/04 | Numerical methods |
| week14: 29/04 | Ground motions for engineering |
| week15: 06/05 | Adjoint wavefields |
| week16: 13/05 | <i>Semester ends</i> |



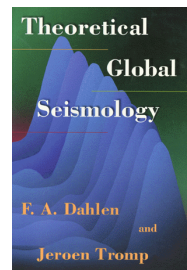
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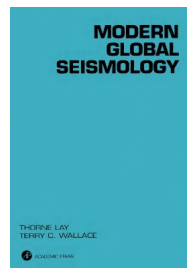
Learning material:



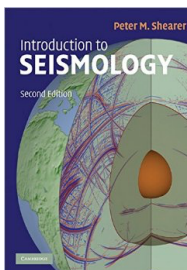
Aki, K. and P. G. Richards, *Quantitative Seismology*, second edition, University Science Books, Sausalito, 2002.



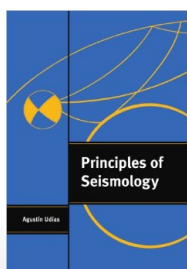
Dahlen, F. A. and J. Tromp, *Theoretical Global Seismology*, Princeton University Press, Princeton, 1998.



Lay, T. and T. C. Wallace, *Modern Global Seismology*, Academic Press, San Diego, 1995.



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