جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

Course Syllabus: Seismology II - ErSE 310

Division	Physical Science and Engineering Division
Course Number	ErSE 310
Course Title	Seismology II
Academic Semester	Spring
Academic Year	2016/2017
Semester Start Date	01/22/2017
Semester End Date	05/18/2017
Class Schedule (Days & Time)	10:30 AM - 12:00 PM | Sun Tue

Instructor(s)

Name	Email	Phone	Office Location	Office Hours
Paul Martin Mai	martin.mai@kaust.edu.sa	+966128080266	3114, 1, Al-Khawarizmi (bldg. 1)	
Daniel Bernhard Peter	daniel.peter@kaust.edu.sa	+966544700405	0146, 1, Al-Khawarizmi (bldg. 1)	

Teaching Assistant(s)

Name	Email

Course Information

Comprehensive Course Description	The course provides an introduction to global seismology and earthquake physics, and consists of two parts. **Part I:** Whole Earth wave propagation (body waves, surface waves, normal modes); imaging Earth 3D structure with ray-based methods; introduction to methods beyond ray-theory; attenuation and scattering of seismic waves. **Part II:** Earthquake source mechanics; earthquake kinematics and scaling laws; earthquake dynamics, fracture modes and crack propagation; introduction to probabilistic seismic hazard assessment. Throughout the semester, students work in teams towards a term project, with intermediate discussion sessions and short reports leading up to a final project report and presentation.
Course Description from Program Guide	The course provides an introduction to global seismology and earthquake physics, and consists of two (2) parts. Part I: Whole Earth wave propagation (body waves, surface waves, normal modes); imaging Earth 3D structure with ray-based methods; introduction to methods beyond ray- theory; attenuation and scattering of seismic waves. Part II: Earthquake source mechanics; earthquake kinematics and scaling laws; earthquake dynamics, fracture modes and crack propagation; introduction to probabilistic seismic hazard assessment. Throughout the semester, students work in teams towards a term project, with intermediate discussion sessions and short reports leading up to a final project report and presentation.
Goals and Objectives	After taking this course, students will have the background knowledge necessary to start an original research project in global theoretical seismology.
Required Knowledge	Basic knowledge of seismic wave propagation, partial differential equations and linear algebra.

Reference Texts	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. Stein and Wysession, *An Introduction to Seismology*, Earthquakes, And Earth Structure - Blackwell - 2003 Shearer, P., *Introduction to Seismology*, Cambridge University Press, 1999.
Method of evaluation	**40.00**% - Written report **40.00**% - Presentation **20.00**% - Homework /Assignments
Nature of the assignments	(1) weekly home works to review the material and expand its understanding; these may require some programming and written assignment; (2) student project, to be conducted in teams of 2 students working on a dedicated subject, and presenting the results as a report and a ~30 min presentation to the class
Course Policies	+ late home works only accepted with consent of instructor, with potential penalty due to late submission + absences should be indicated to the instructor at least two days prior to class; if this is not possible (due to illness), contact instructor as soon as possible after the missed class
Additional Information	n/a

Tentative Course Schedule

(Time, topic/emphasis & resources)

Week	Lectures	Topic
1	Sun 01/22/2017 Tue 01/24/2017	Intro & History + Representation & Betty Theorems
2	Sun 01/29/2017 Tue 01/31/2017	Body Waves
3	Sun 02/05/2017 Tue 02/07/2017	Surface Waves
4	Sun 02/12/2017 Tue 02/14/2017	Normal Modes
5	Sun 02/19/2017 Tue 02/21/2017	Ray Theory + Finite-Frequency
6	Sun 02/26/2017 Tue 02/28/2017	Seismic Sources 1
7	Sun 03/05/2017 Tue 03/07/2017	Seismic Sources 2
8	Sun 03/12/2017 Tue 03/14/2017	Kinematics & Dynamics of Earthquakes
9	Sun 03/19/2017 Tue 03/21/2017	Attenuation & Scattering
10	Sun 03/26/2017 Tue 03/28/2017	Ambient Noise Seismology
11	Sun 04/02/2017 Tue 04/04/2017	-- spring break --
12	Sun 04/09/2017 Tue 04/11/2017	Seismic Hazard Assessment 1
13	Sun 04/16/2017 Tue 04/18/2017	Seismic Hazard Assessment 2
14	Sun 04/23/2017 Tue 04/25/2017	Numerical Methods in Seismology 1
15	Sun 04/30/2017 Tue 05/02/2017	Numerical Methods in Seismology 2
16	Sun 05/07/2017 Tue 05/09/2017	Student Presentations
17	Sun 05/14/2017 Tue 05/16/2017	Student Presentations
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Note

The instructor reserves the right to make changes to this syllabus as necessary.