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

Course Syllabus: Global Geophysics - ErSE 211

Division	Physical Science and Engineering Division
Course Number	ErSE 211
Course Title	Global Geophysics
Academic Semester	Fall
Academic Year	2018/2019
Semester Start Date	08/26/2018
Semester End Date	12/11/2018
Class Schedule (Days & Time)	02:30 PM - 04:00 PM | Mon Wed

Instructor(s)

Name	Email	Phone	Office Location	Office Hours
Georgiy Lvovich Stenchikov	georgiy.stenchikov@kaust.edu.sa	+966128080265		Mon/Thu 4-5 pm, Bldg. 1, #3115
Paul Martin Mai	martin.mai@kaust.edu.sa	+966128080266	3114, 1, Al-Khawarizmi (bldg. 1)	Mon/Thu 4-5 pm, Bldg. 1, #3114

Teaching Assistant(s)

Name	Email
None	

Course Information

Comprehensive Course Description	The course provides introductory descriptions of the Earth solid and fluid natural systems and their interaction. In the first part of the course, focused on fluid earth systems, it discusses the history of earth climate, formation of oceans and atmosphere, biological history, energy balance climate model, general circulation of ocean and atmosphere, climate change, coupled ocean-atmosphere-biosphere climate models. The second part of the course discussed the solid Earth system, in particular, the Earth early geological history, plate motions, magnetism and sea floor spreading, earthquakes and earth structure, gravity, geochronology, heat flow, mantle convection and earth's magnetic field.
Course Description from Program Guide	The course introduces descriptions of solid and fluid Earth systems and their interaction, and is divided in two (2) parts. Part I covers the history of Earth climate, formation of oceans and atmosphere, biological history, energy balance in climate model, general circulation of ocean and atmosphere, climate change, and coupled ocean-atmosphere-biosphere climate models. Part II discusses Earth early geological history, plate motions, sea floor spreading, earthquakes and Earth structure, gravity, geochronology, heat flow, mantle convection and Earths magnetic field.
Goals and Objectives	The course provides introductory descriptions of the Earth solid and fluid natural systems and their interaction. It aims at widening the students view and emphasizing the links between solid and fluid elements of the Earth's geologic and climate systems
Required Knowledge	AMCS 201 or similar math course, or consent of instructor

Reference Texts	-**Required textbooks**: -*Fundamentals of Geophysics (2nd)*, William Lowrie, Cambridge University Press -*Atmospheric Science: An introductory survey*, Wallace, J. M., and P. Hobbs, 2006: Elsevier, 483 pp. -**Reference books**: -*The Solid Earth: An Introduction to Global Geophysics*, by C.M.W. Fowler, Cambridge University Press -*Physics of Climate*, Peixoto, J., and A. Oort, 1992: American Institute of Physics, New York, 520 pp.
Method of evaluation	**20.00**% - Quiz(zes) **30.00**% - Midterm exam **20.00**% - Homework /Assignments **30.00**% - Final exam
Nature of the assignments	Biweekly homework, containing both quantitative (i.e. numerical calculations) and qualitative (i.e. written summaries) exercises
Course Policies	Homeworks are due one week after dissemination, clearly labeled with name, date, homework number; qualitative answers have to be typed, numerical calculations can be shown hand-written
Additional Information	None

Tentative Course Schedule *(Time, topic/emphasis & resources)*		
Week	**Lectures**	**Topic**
1	Mon 08/27/2018	Lecture 1: Fluid Earth Intro: Earth Sciences Program, Solid, and Fluid Earth System Tracks
1	Wed 08/29/2018	Lecture 2: Mathematical models of global circulation processes
2	Mon 09/03/2018	Lecture 3: Solar-Earth Interactions
2	Wed 09/05/2018	Lecture 4: Circulation Systems
3	Mon 09/10/2018	Lecture 5: Atmospheric Thermodynamics 1; Homework 1
3	Wed 09/12/2018	Lecture 6: Atmospheric Thermodynamics 2
4	Mon 09/17/2018	Lecture 7: Quiz
4	Wed 09/19/2018	Lecture 8: Radiation Transport, Main Quantities
5	Mon 09/24/2018	Lecture 9: Radiative equilibrium, greenhouse effect
5	Wed 09/26/2018	Lecture 10: Kirchhoff's law, Lambert's law, Radiative transfer; Homework 2
6	Mon 10/01/2018	Lecture 11: Schwarzschild's equation, Bouguer-Beer-Lambert's law, Plain Parallel Atmospheres
6	Wed 10/03/2018	Lecture 12: Atmospheric absorption and remote sensing, hierarchy of climate models
7	Mon 10/08/2018	Lecture 13: Aerosols and their effect on climate, desert dust
7	Wed 10/10/2018	Lecture 14: Midterm
8	Mon 10/15/2018	Lecture 15: Solar System – Age of the Earth
8	Wed 10/17/2018	Lecture 16: Age of the Earth – Introduction to Plate Tectonics
9	Mon 10/22/2018	Lecture 17: Plate Tectonics – Paleomagnetism I
9	Wed 10/24/2018	Lecture 18: Plate Tectonics – Paleomagnetism II; Homework 3
10	Mon 10/29/2018	Spring Break
10	Wed 10/31/2018	Lecture 19: Earth' Shape, Gravitation, Rotation
11	Mon 11/05/2018	Lecture 20: Measuring & Interpreting Gravity
11	Wed 11/07/2018	Lecture 21: Seismology: Seismic Waves I
12	Mon 11/12/2018	Lecture 22: Seismology: Seismic Waves II
12	Wed 11/14/2018	Lecture 23: Seismology: Waves II & Sources
13	Mon 11/19/2018	Lecture 24: Seismology: Sources & Hazard; Homework 4
13	Wed 11/21/2018	Lecture 25: Thermal properties of the Earth, I
14	Mon 11/26/2018	Lecture 26: Thermal properties of the Earth, II
14	Wed 11/28/2018	Lecture 27: Electric & magnetic properties, I
15	Mon 12/03/2018	Lecture 28: Electric & magnetic properties, II
15	Wed 12/05/2018	Lecture 29: Overview. Preparation for the Final Exam.
16	Mon 12/10/2018	Final Exam

Note

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