



Course Syllabus: Special Topics - ERPE 390

Division	Physical Science and Engineering Division
Course Number	ERPE 390
Course Title	Special Topics
Academic Semester	Spring
Academic Year	2018/2019
Semester Start Date	01/27/2019
Semester End Date	05/23/2019
Class Schedule (Days & Time)	01:00 PM - 02:30 PM Sun Thu

Instructor(s)				
Name	Email	Phone	Office Location	Office Hours
Abdulkader Musa Alafifi	ABDULKADER.ALAFIFI@KAUST.EDU.SA	+966128087280	L 3, R 3219, 5, Al-Kindi (bldg. 5)	Monday, Tuesday, Wednesday: 1-2 pm
Volker Christian Vahrenkamp	VOLKER.VAHRENKAMP@KAUST.EDU.SA	+966128087230	3217, 5, Al-Kindi (bldg. 5)	

Teaching Assistant(s)	
Name	Email

Course Information	
Comprehensive Course Description	This course mainly covers the science and practice of petroleum geology. It includes four modules: 1- Geology basics for non-majors: physical geology, stratigraphy, structure, tectonics 2- Field trip to the Midyan area to illustrate petroleum systems in the Red Sea 3- Petroleum geology 4- Unconventional reservoirs and other terrestrial sources of energy
Course Description from Program Guide	Specialized Ph.D. level courses that cover subjects of particular interest, augment 200- or 300-level courses with in-depth coverage of the foundations, or provide computational applications and extended projects. Special Topics may also introduce new scientific fields and research areas, or broaden and challenge the students experience and expertise in other ways.
Goals and Objectives	The goal is for students to understand the basic elements of petroleum geology, geothermal energy, and energy minerals Learning objectives are: Sedimentary rocks and basins Processes leading to natural accumulations of oil and gas. Exploration for hydrocarbon reservoirs Petroleum systems in the Middle East Conventional and unconventional sources of geothermal energy
Required Knowledge	Undergraduate degree in physical sciences or engineering.

Reference Texts	<p>Petroleum Geoscience by Jon Gluyas and Richard Swarbrick (2004) published by Blackwell Science Ltd. ISBN 978-0-632-03767-4</p> <p>Elements of Petroleum Geology by Richard Selley and Stephen Sonnenberg, 3rd edition (2015) published by Elsevier ISBN: 978-0-12-386031-6.</p> <p>Physical Geology by Steven Earle used under CC-BY 4.0 International licence. Download this book for free at http://open.bccampus.ca</p> <p>Field Guidebook to the Midyan Area by A. Afifi</p>
Method of evaluation	<p>15.00% - Scientific review article presentation</p> <p>35.00% - Midterm exam</p> <p>35.00% - Final exam</p> <p>15.00% - Active participation</p>
Nature of the assignments	<p>Readings from textbooks and papers</p> <p>Laboratory exercise in petrography and seismic interpretation</p> <p>Individual research topics resulting in a short report and a presentation.</p>
Course Policies	<p>Attendance required for all classes and laboratory sessions</p> <p>Participation in field trip</p> <p>Discuss with instructor any problems/exceptions</p>
Additional Information	

Tentative Course Schedule

(Time, topic/emphasis & resources)

Week	Lectures	Topic
1	Sun 01/27/2019	Sediments and sedimentary rocks Reading: Earle Chapter 6
1	Thu 01/31/2019	Sedimentary basins Reading: Selly and Sonnenburg Chapter 8
2	Sun 02/03/2019	Geologic structures and tectonics Reading: Earle Chapters 12 and 10
2	Thu 02/07/2019	Regional geology of the Middle East
3	Sun 02/10/2019	Subsurface environments Selly and Sonnenberg Chapter 4
3	Thu 02/14/2019	Organic matter and source rocks Gluyas and Swarbrick 3.7 Selly and Sonnenberg 5-5.3
4	Sun 02/17/2019	Hydrocarbon properties Selly and Sonnenberg Chapter 2 Gluyas and Swarbrick 1.6
4	Thu 02/21/2019	Hydrocarbon migration Selly and Sonnenberg 5.4-5.5 Gluyas and Swarbrick 4.4
5	Sun 02/24/2019	Hydrocarbon traps and seals Selly and Sonnenberg Chapter 7 Gluyas and Swarbrick 4.2, 4.5, 4.6
5	Thu 02/28/2019	Midyan field trip Fly Jeddah-Tabuk on February 28 Fly Tabuk-Jeddah on March 6
6	Sun 03/03/2019	Midyan field trip
6	Thu 03/07/2019	Review of field observations and quiz
7	Sun 03/10/2019	Reservoir properties Selly and Sonnenberg Chapter 6.0-6.6 Gluyas and Swarbrick 4.3
7	Thu 03/14/2019	Laboratory: Petrography of sedimentary rocks
8	Sun 03/17/2019	Review session
8	Thu 03/21/2019	Midterm exam
9	Sun 03/24/2019	Spring Break
9	Thu 03/28/2019	Exploration methods - basin evaluation, gravity, magnetics Selly and Sonnenberg 3.3.1-3.3.3 and 3.5 Gluyas and Swarbrick 2.1-2.2
10	Sun 03/31/2019	Exploration methods - seismic Gluyas and Swarbrick 2.3 Selly and Sonnenberg 3.3.4-3.4
10	Thu 04/04/2019	Exploration methods - well and formation evaluation Selly and Sonnenberg 3.1-3.2 Gluyas and Swarbrick 2.4-2.6
11	Sun 04/07/2019	Seismic interpretation and mapping demonstration
11	Thu 04/11/2019	Laboratory seismic interpretation and mapping exercise
12	Sun 04/14/2019	Appraisal of hydrocarbon discoveries Gluyas and Swarbrick 5.1-5.8 Selly and Sonnenburg 6.8

12	Thu 04/18/2019	Exploration plays and risks Gluyts and Swarbrick 4.6-4.9 Selley and Sonnenberg 10
13	Sun 04/21/2019	Unconventional oil and gas Selley and Sonnenberg Chapter 9
13	Thu 04/25/2019	Petroleum systems in the Middle East
14	Sun 04/28/2019	Case studies: student presentations 1
14	Thu 05/02/2019	Case studies: student presentations 2
15	Sun 05/05/2019	Conventional geothermal systems
15	Thu 05/09/2019	Low enthalpy geothermal systems
16	Sun 05/12/2019	Energy minerals and gas hydrates
16	Thu 05/16/2019	Review session
17	Sun 05/19/2019	Review session
17	Thu 05/23/2019	Final Exam

Note

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