

ERTH 4306

Resource Basin Analysis

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Textbook Allen and Allen, 2013. *Basin Analysis*, 3rd ed., Wiley; available online
CuLearn access to lab assignments and learning resources

The geology and resource economics of sedimentary basins reflect a dynamic balance between Earth's surficial processes (climate, environments, erosion, sea level, life) and deformation of the lithosphere (plate tectonics). Sedimentary basins are the principal repository of non-renewable energy and mineral (metallic, non-metallic, industrial) resources, and repository for CO₂ sequestration and nuclear-waste storage. Basins are the substrate for renewable (solar, wind) infrastructure. ERTH 4306 uses geological databases and methodologies to examine basin origins, stratigraphic architecture, sediment routing systems, organic maturation, and movement of crustal fluids. The geologic template rolled out includes exploration risk analysis that is applicable to all mineral/fluid resource economies, and geologically influenced social economies. Instructional aids include the textbook, journal papers, and website resources. The course is presented in a professional training context: you are a geologist, not a student. Lab exercises introduce standard subsurface mapping skills, and the *Basin Project* puts you in an industry scenario to hone your skills and knowledge of basin analysis to management. Academic evaluation includes lab assignments (50%) and the project (50%).

<i>Lecture (Tuesday 0830-1030)</i>	<i>Lab (Tuesday 1130-1430)</i>
<i>Sept 11</i> Introduction: Course / Lithosphere	Rocks, Resources, and Commodities (5 %)
<i>Sept 18</i> Extensional Basins	Basin types (5%)
<i>Sept 25</i> Flexural Basins	Mapping tools (20%)
<i>Oct 2</i> Wrench Basins	(cont.)
<i>Oct 9</i> Sequence/Seismic Stratigraphy	Sequence stratigraphy framework (10%)
<i>Oct 16</i> Basin Fill: siliciclastics	(cont.)
<i>Oct 23</i> Basin Fill: carbonate, evaporites	Carbonate/evaporite data integration (5%)
<i>Oct 26-30 = Fall Break</i>	
<i>Nov 6</i> Basin Maturation	<i>Basin Project development</i>
<i>Nov 13</i> Hydrodynamics	Hydrodynamics (5%)
<i>Nov 20</i> The Petroleum/Mineral "Play"	<i>Basin Project development</i>
<i>Nov 27</i> Risk Analysis & Decision Making	
<i>Dec 4 (or later)</i> Project Presentations to Management	

LEARNING OUTCOMES

ERTH 4306 [0.5 credit]

Resource Basin Analysis

Surface and subsurface geological and geophysical techniques used to define the distribution and origin of geological basins, the architecture of basin fill, and characterize the distribution of water, petroleum and mineral resources.

Prerequisite(s): EARTH 3203 or EARTH 3206, EARTH 3205, and EARTH 3806.

Lectures, seminars and laboratory five hours a week.

Expected Outcomes

1. Review sedimentary rock classification and rock types; be able to identify
2. Understand role of resource geology in Canadian and international context
3. Learn fundamental subsurface mapping techniques
4. Learn basics of geophysical borehole log analysis
5. Integrate suites of subsurface data to resolve patterns and trends
6. Review siliciclastic and carbonate facies successions; learn significance for porosity and resource capture
7. Communicate (verbal) interpretation of integrated dataset for purposes of defining resource potential

Course Requirements/Instruction Format/Expectations

The textbook is available online, and additional reading resources are provided through the website. Required readings per week are defined. Learning outcomes and instructor expectations with regard to background knowledge of students coming into the course are defined on the website.

Instruction for this course is a mixture of synchronous delivery through CuLearn's Big Blue Button, posted lecture slides, and synchronous lab support as needed. The instructor requested that all students confirm accessibility through their internet access for this approach prior to start of classes. All lab materials are accessible through the website and are to be uploaded through the website.

Requests for Academic Accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

Pregnancy obligation

Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf

Religious obligation

Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf

Academic Accommodations for Students with Disabilities

If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. carleton.ca/pmc

Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and its survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: carleton.ca/sexual-violence-support

Accommodation for Student Activities

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. <https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>

For more information on academic accommodation, please contact the departmental administrator or visit: students.carleton.ca/course-outline