



COURSE OUTLINE

The course description is online @ <http://camosun.ca/learn/calendar/current/web/geos.html>

Ω Please note: the College electronically stores this outline for five (5) years only.
 It is **strongly recommended** you keep a copy of this outline with your academic records.
 You will need this outline for any future application/s for transfer credit/s to other colleges/universities.

1. Instructor Information

(a)	Instructor:	Dr. Tark Hamilton		
(b)	Office Hours:	Mon & Thur: 2:30-3:20, Wed & Thur: 9:30-10:20; Fri 11:30-12:20		
(c)	Location:	Young 200		
(d)	Phone:	250-370-3331	Alternative Phone: (field trips – cell)	250-216-6448
(e)	Email:	hamiltont@camosun.bc.ca read Mon-Fri only, tark_hamilton@yahoo.com https://faculty.camosun.ca/tarkhamilton/course/geos-240-sedimentary-geology/ (updates and notices throughout course) see also Geos 100 pages for review Google on tarkhamilton to find these		
(f)	Website:			

2. Intended Learning Outcomes

(No changes are to be made to these Intended Learning Outcomes as approved by the Education Council of Camosun College.)

Upon completion of this course the student will be able to:

1. Describe the three major sediment types, their settings and how they provide environmental records, including clastic sediments, chemical sediments, and biological sediments.
2. Describe common sedimentary minerals and their roles as matrix and cements and analyse the significance of sedimentary structures, fossils and trace fossils.
3. Identify common sediments and the roles of weathering, erosion, transport, deposition in their genesis and relate particle size of sediments to the energetics of sedimentary transport.
4. Utilize the petrographic microscope for the identification of sedimentary minerals and textures.
5. Relate suites of sedimentary rocks to adjacent and sequential environments taking into account effects of physics, chemistry and biology.
6. Describe the stratigraphic and depositional effects of changing base level or sea level with reference to the stratigraphic principles, facies, time assignments and correlation tools of: biostratigraphy, magnetostratigraphy and lithostratigraphy.
7. Describe several types of sedimentary basins and their assemblages of sediments and compare and contrast geophysical and well-logging exploration techniques related to basin analysis.
8. Identify different tectonic settings using lithologies and sediment properties.
9. Compare sedimentary resources, their settings and uses including: aggregates, coal, sedimentary iron formations, sediment hosted metals deposits, groundwater and hydrocarbon reservoirs.

3. Required Materials

(a)	Texts	“Sediments and Basins” Andrew Miall, University of Toronto, 2006, McGraw Hill, 384 p. & 1 CD figures, ISBN:-10-0-07-098047-0, required
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(b)	Lab Manuals	<p>Background Texts: Canadian Edition Earth: An Introduction to Physical Geology, E.J. Tarbuck, F.K. Lutgens, C.J. Tsujita & S. R. Hickock 4th ed. Prentice Hall 2014. (Note: this has sections on Beaches, Deep sea, Deserts, Erosion, Glaciers, Sediments, Geological Time, Weathering, etc.) Earlier editions suitable too especially the longer Ed. 1 without Hickock.</p> <p>Supplemental on line text: <u>Physical Geology</u>, Steven Earle, Thompson River's University, BC Campus Open Ed. September 3, 2015. This is a free online text book with alternate presentations covering most of the topics presented in the introductory physical geology course by my lecture power point presentations. Link http://open.bccampus.ca/find-open-textbooks/?uuid=52166cd1-e380-4e1b-9a6f-d891936e4749</p> <p>"Ancient Environments and the Interpretation of Geologic History" 3rd ed. Lynn Fichter and David Poche. Out of print. Lab copies available for loan only. Do not mark in books, deface or remove pages. These are out of print and no longer available.</p> <p>"AGI Laboratory Manual in Physical Geology" 10th edition by Busch and Tasa, 2014 (From Geos 100) for mineral and rock identification and selected exercises. Labs 2, 4, 5, 6, 7, 8 have handy reference and background materials. Labs 11, 12, 13, 14, 15 provide in depth examples on specific sedimentary facies. Limited in-lab-use-only loaner copies available of older editions. Older editions of AGI are suitable and recommended for your personal aid in labs.</p> <p>Hand lens, pocket knife, sturdy hiking boots</p>
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4. Course Content and Schedule

Instruction 14 weeks: Jan 10 - April 14

a. Class room Lecture: 3 hours 10:30-11:20 Tue – **WT202**, Wed, Thur - **WT201**

b. Lab 3 hours Fri – 1:30 - 4:20 PM **F300**. Your lab tech this term is Andrea. Please keep the lab materials organized for her and for the other students. Return all materials to their shelves, cupboards and carts by end of lab at 4:20 PM. Do not leave a mess for Andrea or your disabled instructor!

(Lab attendance is mandatory, you must pass the lab to pass the course). Please come to labs on time as there is often an introductory lecture to get you started, a quiz or a field trip in the lab period, none of which will help you if you miss them!

Most Labs are due at the *beginning* of the following lab period the week following their issue. There are no make-up labs as there is limited room on the carts and multiple labs to present each week. Labs will normally be handed out in the Wednesday lecture for that week and are available on Tark's course website near the bottom of your page: <https://faculty.camosun.ca/tarkhamilton/course/geos-240-sedimentary-geology/> (updates and notices throughout course) see also Geos 100 pages for review [Google on tarkhamilton](#) to find these

Access to the Geoscience Lab and its rocks, maps and displays **F300** is limited, use your lab time efficiently, **most labs require 1 hour of reading prior to coming to the lab & 2-3 hours after the lab** to complete on your own or with your partner for the exercises & report. Geos 100 labs are scheduled for Tues: 9:30-12:20 and Wed: 2:30-5:20 and limited access may be arranged in advance with Dr. Vic Levson the lab instructor.

c. Local Field Trips will occur during lab time given sufficient transportation & 1 or 2 weekend day trips are recommended. My reminder in lecture will give 2 weeks advance notice. Field trips count the same as 1 lab towards your lab mark.

5. Basis of Student Assessment (Weighting)

a. Theory Tests: covering: **vocabulary, rocks and minerals in sediments, stratigraphy, geological time, fossils, evolution, physical processes (weathering, transport, deposition, bedforms, sedimentary**

structures, geological settings and facies variations (bars, beaches, channels, deltas, moraines etc.), sediment evolution, sedimentary systems, basins etc. Test 1 – 10%, Test 2 – 20%, Final – 35%

- b. Labs and field trips are collectively worth 25% of your course mark. Lab work will include some optical mineralogy and use of the petrographic microscope to examine sedimentary rocks and interpret their textures. Any lab quizzes are worth 2 labs. See sequence of topics below in box. Lab work includes some book work and homework on sedimentary processes, concepts from handouts taken from Fichter's AE book: sediment classification, evolution, interpreting stratigraphic sequences from cross sections and maps.
- c. Term Paper and Power Point Presentation 10% of Theory mark. This will be a scientific term paper with: title, abstract, introduction, photos, maps or figures, tables or graphs, data, interpretation and conclusions with a bibliography of references cited in the text. Examples will be given on the website. A discussion with Tark, a topic and an outline are due prior to January 27 in lab period. The power point presentation should be simple, 5-10 minutes long and have 3-5 slides to introduce your topic. Examples of past topics include: sedimentary geology of a particular basin (WCB-Alberta, New Zealand), sediments on Mars, placer gold deposits, ground water pollution of an aquifer and remediation, stratigraphic problems in either bedrock sections or unconsolidated sediments (facies changes versus unconformities in a given section), local field studies (Glacio-marine sediments at Witty's Lagoon or Mt. Doug), stratigraphy of a small map area (e.g. Comox Formation on Saanich Peninsula, bedrock stratigraphy and structure of ...).

Labs, Tests & Midterm Schedule: Holidays: Feb. 9 Family , 12-13 read, April 3-6 Eostre

Lab Date	Experiment	Pre-Lab Reading
Schedule: Approximately 1 Chapter in both text and lab manual per week		
Week 1: Jan 9-15 Review & Introduction to Sediments & Sed. Geology Miall Ch 1 & 2, AE Sec 1-2: 9-37, AGI Ch:6		
1. Lab 1 <u>Jan 13</u>	Review: Weathering, Grains & Cements, Sediment Production, Classification, Transport, Deposition, Hiatus, Geological Time, Maps, Cross Sections, Tectonic settings & Wilson cycles	
	AGI Ch:6	
Week 2: Jan 16-22		Miall Ch 1 & 2, AGI Manual Ch 12
2. Lab 2 <u>Jan 20</u>	Porosity, Permeability, Sed.Phys.Props., Aquifers & Reservoirs	AE 9-37, AGI Ch: 6-12
Week 3: Jan 23-29		Miall Ch 3, AGI Manual Ch's 4, 6
3. Lab 3 <u>Jan 27</u>	Clastic Environments: Gravel, Sand, Mud: transport, deposition, energy, sorting, settings, facies	AE 38-56 & AGI:Ch 5,6,7
Week 4: Jan 30-Feb 5		Miall Ch 3, Ch 1 & 2, AGI Ch 6
4. Lab 4 <u>Feb 3</u>	Optics Petrography Sedimentary minerals, Sedimentary Structures	Off Book see website
Week 5: Feb 6-12		Miall Ch 4 & 5, AGI Manual Ch 8
Term Paper Topic Selection & Discussion with Tark due prior to this date		
5. Lab 5 <u>Feb 10</u>	Sedimentation: Stokes' Law: Fluid Viscosity, particle size, shape, settling velocity, sedimentation, particle size distribution:	Off book
6. Week 6: Feb 13 - 19 <u>Reading Week</u> Complete Term Paper 1 st Draft by Feb 21 <u>No classes or labs</u>		
Week 7: Feb 20 - 26		Miall Ch 6, AGI Manual Ch's: 6, 8; AE p.57-68
7. Lab 6 <u>Feb 24</u>	Carbonates, Biogenic Sediments, Evaporites & Time Lab Geological Time, Microfossils, Biostratigraphy, & Sedimentation Rates	AE 57-68, AGI Ch 6, 8
Week 8: Feb 27 - Mar 5		Miall Ch 7, AGI Manual Ch's: 6, Ch's 11, 13, 14, 15; AE p.69-88
8. Lab 7 <u>Mar 3</u>	Theory Test 1 & Strip Log from AE Depositional Environments & Strip Logs pp.69-88, AGI Ch. 6	
Week 9: Mar 6 – 12		Miall Ch 8, AGI Manual Ch's 11, 13, 14, 15; AE p.89-118
9. Lab 8 <u>Mar 10</u>	Sedimentary Rock Quiz 1 st 1.5 hours & Facies from AE pp. 89-118 strip logs & maps	
Week 10: Mar 13 – 19		Miall Ch 9; AE p.185-200
10. Lab 9 <u>Mar 17</u>	Burgess Shale Fauna & HW: Sequence Stratigraphy AE pp.185-200 Eustasy & Sequence Theory + AGI Ch 6,15	
Week 11: Mar 20 – 26		Miall Ch 10, AGI Manual 9, 10
11. Lab 10 <u>Mar 24</u>	Sponge Reefs & Hecate Strait Cores & Glacial Isostasy	
Week 12: Mar 27 – Apr 2		Miall Ch 11, AGI Manual 9, 10: AE p.155-184
12. Lab 11 <u>Mar 31</u>	Sedimentary Tectonics	AE pp.155-184
Week 13: Apr 3 - 9		Miall Ch 12, AGI Manual Ch 2
13. Mar 17 Lab 10	Theory Test 2 & Lab windup. All lab assignments due in.	
Week 14: Apr 10 - 15		
14. <u>Apr 12-14</u>	Lecture Windup & Student Paper Power Point Presentations	

TBA: Possible Local Lab/Class or Saturday or Sunday Field Trips:

1.) Beaches and Quaternary Sediments – Parker Park, Willows, Clover Point

2.) Sooke & Muir Creek Eocene-Oligocene Sooke Formation;

3.) Sidney & Deep Cove Cretaceous Comox Formation, Saanich Sandstone Member, Warrior Point, Armstrong Point

- Sedimentary Rock, mineralogy, texture, structures will be on a practical Identification Quiz in 1st part of lab week 9 (no late starts)
- Theory exams in Weeks 8 and 10
- Final exam date announced on Camlink Feb 24. And Final is cumulative and will cover **all** course & lab material.

Don't make travel arrangements for the final exam period April 17-29. Only medical excuses will be allowed.

• At least a passing grade on lab marks must be achieved prior to the exam in order to write the final exam.

• You must pass both the lecture portion and the lab portion in order to pass the course

• Students are expected to come to lab on time – late arrivals will miss tests, quizzes or field trips as these begin promptly at the start of lab period. Prelab readings and assignments in AE and AGI manuals are due as you walk in the lab door. Without them you cannot do the lab. There is not time to read >20 pages, assimilate new terms and concepts and to do the lab in the lab period.

• All lab reports must be stapled with both you and your partner's names. All lab reports are joint projects of 2 people, these labs require partners for concepts, measurements, calculations and interpretations.

6. Grading System

(No changes are to be made to this section unless the Approved Course Description has been forwarded through the Education Council of Camosun College for approval.)

Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D	Minimum level of achievement for which credit is granted; a course with a "D" grade cannot be used as a prerequisite.	1
0-49	F	Minimum level has not been achieved.	0

Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy E-1.5 at camosun.ca for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	<i>Incomplete:</i> A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family.
IP	<i>In progress:</i> A temporary grade assigned for courses that, due to design may require a further enrollment in the same course. No more than two IP grades will be assigned for the same course. (For these courses a final grade will be assigned to either the 3 rd course attempt or at the point of course completion.)

CW	<i>Compulsory Withdrawal:</i> A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement.
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7. Recommended Materials or Services to Assist Students to Succeed Throughout the Course

LEARNING SUPPORT AND SERVICES FOR STUDENTS

There are a variety of services available for students to assist them throughout their learning. This information is available in the College calendar, at Student Services, or the College web site at camosun.ca.

STUDENT CONDUCT POLICY

There is a Student Conduct Policy **which includes plagiarism**. It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, at Student Services, and the College web site in the Policy Section.