



# UNIVERSITY OF CALGARY

## DEPARTMENT OF GEOSCIENCE COURSE OUTLINE

1. **Course:** GLGY 597/697, Geostatistics

Lecture Sections:

L01: MoWe, 17:00-18:15, SA 147

Dr. L. Bentley, Office: ES 262, Ph. 403-220-4512, [lbentley@ucalgary.ca](mailto:lbentley@ucalgary.ca), Office Hours: Thursday 1400-1500 hrs.

Desire 2 Learn (D2L) GlgY 597/697 L01

Geoscience Department ES 118, 403-220-5841, [geoscience.ucalgary.ca](http://geoscience.ucalgary.ca), [geosci@ucalgary.ca](mailto:geosci@ucalgary.ca)

2. **Prerequisites:** Mathematics 253 or 267 or 277 or 283 or Applied Mathematics 219 and Mathematics 211 and completion of at least 15 full-course equivalents or consent of the Department. See also Geology [Course Descriptions](#) of the University Calendar.

**Antirequisites:** Credit for both Geology 597 and 697 will not be allowed.

3. **Grading:** The University policy on grading and related matters is described sections [F.1](#) and [F.2](#) of the online University Calendar. In determining the overall grade in the course the following weights will be used:

Assignments/Labs	15%
Project	25%
Reading assignments	10%
Midterm test	15% (Tentatively 20 Oct, 2014)
Final Examination	35% (To be scheduled by the Registrar)

Grading Scale

Percentage	Grade
92	A+
85	A
82	A-
78	B+
75	B
72	B-
68	C+
65	C
60	C-
55	D+
50	D
<50	F

4. **Missed Components of Term Work:** The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in [Section 3.6](#). It is the student's responsibility to familiarize himself/herself with these regulations. See also [Section E.6](#) of the University Calendar

5. **Course Materials:** *"An Introduction to Applied Geostatistics", Any Edition, by Isaaks and Srivastava, Oxford University Press.*

7. **Examination Policy:** Closed book, calculators allowed, no other electronic devices allowed. Students should also read the Calendar, [Section G](#), on Examinations.

8. **Writing across the curriculum statement:** The quality of the student's writing in homework, laboratory reports and projects will be a factor in the evaluation of those reports. See also [Section E.2](#) of the University Calendar.
9. **OTHER IMPORTANT INFORMATION FOR STUDENTS:**
- (a) **Academic Misconduct:** (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under [Section K](#). Student Misconduct to inform yourself of definitions, processes and penalties
  - (b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on [assembly points](#).
  - (c) **Academic Accommodation Policy:** Students with documentable disabilities are referred to the following links: [Calendar entry on students with disabilities](#) and [Student Accessibility Services](#).
  - (d) **Safewalk:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
  - (e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information see also <http://www.ucalgary.ca/secretariat/privacy>.
  - (f) **Student Union Information:** VP Academic Phone: 220-3911 Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca).  
SU Faculty Rep. Phone: 220-3913 Email: [sciencerep@su.ucalgary.ca](mailto:sciencerep@su.ucalgary.ca); [Student Ombudsman](#)
  - (g) **Internet and Electronic Device Information:** You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.
  - (h) At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses ([www.ucalgary.ca/usri](http://www.ucalgary.ca/usri)). Your responses make a difference - please participate in USRI Surveys.

Geology 597 Geostatistics  
Fall, 2014

Lectures MW 1700-1815 SA147  
Laboratory M ES 254, W ES 924 1830 - 2130

Date	Day	Lecture	Reading	H.W. Assignment	Due Date
08-Sep	M	Organization and Introduction			
	(LAB)				
10-Sep	W	Review Walker Lake & Stats	Ch 1, App. A	pdf, cdf, histograms	
		Random Variables	Ch.2 App B		
		Probability Models			
15-Sep	M	pdf, cdf, normal and log-normal	Ch 3, 4, 5, 6		
		Regional Variables		Ass. 1	29-Sep
	(LAB)			Introduction to matlab	
17-Sep	W	Bivariate Distributions		Introduction to Blackfoot Data	
		Data Exploration			
22-Sep	M	Regression	Ch 3, 4, 5, 6		
	(LAB)			Continue Ass. 1	
24-Sep	W	Regression			
29-Sep	M	Variogram Construction	Ch. 7, 14, 16		
	(LAB)			Ass. 2	15-Oct
01-Oct	W	Variogram Construction	Ch 16		
06-Oct	M	Estimation			
	(LAB)	Introduce Project		Ass. 3 to G697	20-Oct
				Project Data Sets	
08-Oct	W	Variogram + Sgems	Ch. 8, 9, 10,11		
13-Oct	M	<b>Thanksgiving</b>		<b>No Class</b>	
	(LAB)	Project			
15-Oct	W	Estimation	Ch. 12		
20-Oct	M	Midterm Review	Lab		
	(LAB)	Project		Data Exploration	
22-Oct	W	Midterm, no lab			

Data Exploration - Univariate distributions, trends, covariance and correlation.

27-Oct	M	Kriging	Ch 15	Assign Journal Articles	
	(LAB)	Project		<i>Spatial Structure</i>	
				Modeling spatial structure	
29-Oct	W	Kriging			
03-Nov	M	Kriging - Cross validation	Ch 13		
	(LAB)			Kriging and Estimation Variance	
05-Nov	W	Block Kriging/indicator			
<b>8-11 Nov</b>		<b>Reading days</b>			
11-Nov	M	<b>No Class, No Lab</b>			
	(LAB)				
12-Nov	W	Cokriging	Ch 17, 18, 19, 20, 21	Parks & Bentley due	
				Cokriging and Estimation Variance	
17-Nov	M	Cokriging		Johnson & Dreiss Due	
	(LAB)			Cross validation and error analysis	
19-Nov	W	Stochastic Simulation			
24-Nov	M	Stochastic Simulation		Hirsche et al. due	
	(LAB)	Project		Stochastic Simulation	
26-Nov	W				
01-Dec	M			Glg 697 Readings Due	
	(LAB)				
03-Dec	W			<b>Projects due</b>	

Spatial structure, variograms, cross-variograms, transformations, heirarchy of scales, model variograms, anisotropy

Stochastic simulation, comparison with cokriged and kriged maps

**Final Exam**