



UNIVERSITY OF CALGARY

DEPARTMENT OF GEOSCIENCE COURSE OUTLINE FALL 2015

1. **Course:** GLGY 697, Advanced Geostatistics

Lecture Sections:

L01: MoWe, 17:00-18:15, SB 105

For a listing of all lab sections corresponding with this course, please see the following link:

http://geoscience.ucalgary.ca/geoscience_info/courses/f15

Dr. L. Bentley, Office: ES 262, Ph. 403-220-4512, bentley@ucalgary.ca, Office Hours: Thursday 14:00-15:00 hrs.

Geoscience Department ES 118, 403-220-5841, geoscience.ucalgary.ca, geoscience@ucalgary.ca

2. **Prerequisites:** Mathematics 253 or 267 or 277 or 283 or Applied Mathematics 219 and Mathematics 211. See also Geology [Course Descriptions](#) of the University Calendar.

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

Notes: Completion of Mathematics 331 and/or Statistics 357 or 327 is recommended prior to taking this course.

3. **Grading:** The University policy on grading and related matters is described in 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	30%
Reading assignments	10%
Term Paper	10%
Midterm test	15% (Tentatively Wed. 4 Nov. 2015)
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.*

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

7. **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.

8. **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) **Student Accommodations:** Students needing an Accommodation because of a Disability or medical condition should contact Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities available at http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.pdf. Students needing an Accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to the Associate Head of Geoscience, Dr. E.S. Krebs by email krebs@ucalgary.ca or phone 403-220-5850.
- (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: 403 220-3911 Email: suvpaca@ucalgary.ca
SU Faculty Rep. Phone: 403 220-3913 Email: science1@su.ucalgary.ca, science2@su.ucalgary.ca and science3@su.ucalgary.ca;
Student Ombuds Office: 403-220-6420 Email: ombuds@ucalgary.ca; <http://ucalgary.ca/provost/students/ombuds>
- (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) **U.S.R.I.:** 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). Your responses make a difference – please participate in USRI Surveys.

Geology 697 Geostatistics
 Fall, 2015
 Version Sept 1, 2015

Lectures MW 1 1700-1815 SB105
 Laboratory M, W ES 924 1830 - 2130
 TA: Amir Niazi

Date	Day	Lecture	Reading	H.W. Assignment and Labs	Tentative Due Date
07-Sep	M	No class- Labor Day			
08-Sep	W	Organization and Introduction; Introduce Devon data set		No Lab	
14-Sep	M	Review Walker Lake & Statistics; Random Variables; Probability Models	Ch 1; App. A; Ch 2; App B	Ass. 1	21-Sep
16-Sep	W	pdf, cdf, normal and log-normal; Regional Variables		Ass. 1	23-Sep
21-Sep	M	Bivariate Distributions, Data Exploration	Ch 3, 4, 5, 6	<i>Introduction to SGEMS Ass. 2</i>	28-Sep
23-Sep	W	Regression	Ch 3	<i>Introduction to SGEMS Ass. 2</i>	30-Sep
28-Sep	M	Regression		Ass. 2 continued	
30-Sep	W	Variogram Construction	Ch. 7, 14, 16	Ass. 2 continued	
05-Oct	M	Variogram Construction		Ass. 3	
07-Oct	W	Variogram and Introduction to SGEMS		Ass. 3	
12-Oct	M	Thanksgiving		No Class	
14-Oct	W	Estimation	Ch 8, 9, 10,11	Ass 4	28-Oct
19-Oct	M	Estimation		Ass 4	02-Nov
21-Oct	W	Kriging		Ass. 4 cont	
26-Oct	M	Kriging		Ass 4 cont; Reading Assignments	
28-Oct	W			Ass 5	16-Nov
02-Nov	M	Midterm Review		Ass 5; (Parks & Bentley 1996 Due)	18-Nov
04-Nov	W	Midterm		No Lab	
09-Nov	M	Review Midterm; Kriging	Ch 12	No Lab	
11-Nov	W	No Class, No Lab			
11-15 Nov.		Reading days			
16-Nov	M	Cross-validation	Ch 15	Ass. 6 (Johnson & Dreiss 1989 Due)	30-Nov
18-Nov	W	Block Kriging/indicator	Ch 13, 18	Ass. 6	02-Dec
23-Nov	M	Cokriging	Ch 17	Ass. 6 Cont (Hirsche et al. 1997 Due)	
25-Nov	W	Cokriging		Ass. 6 Cont	
30-Nov	M	Stochastic Simulation		Ass 7 (G697 only Jensen et al 1996; Zheng et al 2000 Due)	07-Dec
02-Dec	W	Stochastic Simulation		Ass 7	07-Dec
07-Dec	M	Final Exam Review	Last Class		

Final Exam 11-22 December

- Ass. 1 Basic statistics
- Ass. 2 Data Exploration - Univariate distributions, trends, covariance and correlation regression
- Ass. 3 Experimental Variograms
- Ass. 4 Variogram Modeling
- Ass. 5 Kriging, cross validation and error analysis
- Ass. 6 Cokriging, cross validation and error analysis
- Ass. 7 Stochastic simulation