

UNIVERSITY OF CALGARY  
DEPARTMENT OF GEOSCIENCE  
COURSE OUTLINE

1. Course: GEOPHYSICS 559 – GEOPHYSICAL INTERPRETATION

Lecture Section:        L01                    MWF                    12:00-12:50                    SA 106                    WINTER 2014

**Instructor(s):**        Dr. L.R. Lines                    ES 570B                    220-2796                    [lrines@ucalgary.ca](mailto:lrines@ucalgary.ca)

Desire 2 Learn: GOPH 559 L01 (Winter)

Geoscience Department ES 118; (403) 220-5841; [geoscience.ucalgary.ca](http://geoscience.ucalgary.ca)

1. PREREQUISITE(S): Geophysics 355 and Geophysics 457 or Geology 461 or 597

See section 3.5.C in the Faculty of Science section of the online Calendar (<http://www.ucalgary.ca/pubs/calendar/current/sc-3-5.html>)

3. **GRADING:** The University policy on grading and related matters is described in “Academic Regulations, sections F.1 and F.2” of the online University Calendar (<http://www.ucalgary.ca/pubs/calendar/current/f-1.html> and <http://www.ucalgary.ca/pubs/calendar/current/f-2.html>) In determining the overall grade in the course the following weights will be used:

Lab & Assignments	30%
Midterm Exam	15% (February 12 2014)
Project presentation	30% (20% for verbal, 10% for written)
Final Examination	25% (To be scheduled by the Registrar)

Each piece of work (assignment, laboratory report, midterm test or final examination) submitted by the student will be assigned a percentage score. The student’s average percentage score for the various components listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

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: <http://www.ucalgary.ca/pubs/calendar/current/sc-3-6.html>. It is the student's responsibility to familiarize himself/herself with these regulations. See also <http://www.ucalgary.ca/pubs/calendar/current/e-3.html>.

5. Dates and times of class exercises held outside of class hours

**REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY.** If you have a clash with this out-of-class-time-activity, please inform your instructor as soon as possible so that alternative arrangements may be made for you.

6. **EXAMINATION POLICY:** Non-programmable calculators will be permitted to answer quantitative questions on exams, if applicable, and permission to do this will be clearly indicated on the examination paper.

Students should also read the Calendar, Section G, on Examinations: <http://www.ucalgary.ca/pubs/calendar/current/g.html>.

7. In this course, the quality of the student's writing in laboratory reports will be a factor in the evaluation of those reports. See also <http://www.ucalgary.ca/pubs/calendar/current/e-2.html>.

**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 K. Student Misconduct (<http://www.ucalgary.ca/pubs/calendar/current/k.html>) 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 at <http://www.ucalgary.ca/emergencyplan/assemblypoints>.**
- (c) **ACADEMIC ACCOMMODATION POLICY.** Students with documentable disabilities are referred to the following links: Calendar entry on students with disabilities: <http://www.ucalgary.ca/pubs/calendar/current/b-1.html>  
Student Accessibility Services: [www.ucalgary.ca/access](http://www.ucalgary.ca/access)
- (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:** [suypaca@ucalgary.ca](mailto:suypaca@ucalgary.ca),  
SU Faculty Rep. **Phone:** 220-3913 **Email:** [sciencerep@su.ucalgary.ca](mailto:sciencerep@su.ucalgary.ca) Website <http://www.su.ucalgary.ca/home/contact.html>.  
Student Ombudsman: [www.ucalgary.ca/provost/students/ombuds](http://www.ucalgary.ca/provost/students/ombuds); [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca) 220-6420
- (g) **INTERNET and ELECTRONIC COMMUNICATION DEVICE Information.** You can assume that in all classes that you attend, **your cell phone should be turned off.** 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.

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COURSE OUTLINE

GEOPHYSICS 559  
GEOPHYSICAL INTERPRETATION

TERM:	Winter 2014			
PREREQUISITE(S):	Geophysics 355 and Geophysics 457 or Geology 461 or 597			
LECTURER(S):	Dr. L.R. Lines	ES 570B	220-2796	<a href="mailto:lrines@ucalgary.ca">lrines@ucalgary.ca</a>
LECTURE :	L01	MWF	12:00-12:50	SA 106
LAB(S):	B01/02/03/04/05	T	08:00/10:00/12:00 14:00/16:00	ES 924
TEXT: <u>Required:</u>	<b>"Fundamentals of Geophysical Interpretation"</b> , by Lines and Newrick, Society of Exploration Geophysicists publication. The text is sold in the University Bookstore.			
RESERVE READING ROOM:	N/A			
MARK DISTRIBUTION:	A.	<u>Composition of Final Grade</u>		

Lab & Assignments	30%
Mid-term Exam	15% (February 12 2014)
Project Presentation	30% (20% for verbal, 10% for written)
Final Exam	25%

Students who are absent from the midterm exam or final laboratory exam because of illness or other unforeseen circumstances may be granted an excused absence by the Course Coordinator (midterm exam) or Lab Coordinator (final laboratory exam) upon presentation of adequate documentation (a completed Physician/Counsellor Report form <http://www.ucalgary.ca/registrar/PDFs/physcoun.pdf> for illness; equivalent documentation for other circumstances). There will be no "make-up" examinations for excused absences. The weight assigned to the midterm examination will be transferred to the final examination.

Similarly, students who are unable to submit laboratory reports or assignments on time because of similar circumstances will be required to submit the same type of documentation to the Lab Coordinator in order to be considered for a time extension.

B. Final Exam

There will be a final examination scheduled by the Registrar's Office.

C. Components of Course for Which a Passing Grade is Essential

Students must achieve a passing grade (minimum of D) on both the lecture portion of the course (average of the midterm and final exams) and the laboratory portion of the course to qualify for a passing grade overall.

D. Grading Scheme

A+	95 – 100%
A	88 – 94%
A-	81 – 87%
B+	75 – 80%
B	70 – 74%
B-	65 – 69%
C+	60 – 64%
C	55 – 59%
C-	50 – 54%
D+	45 – 49%
D	40 – 45%
F	<40%

## E. TENTATIVE LECTURE SCHEDULE AND LAB SCHEDULE

Jan. 8	Course Introduction – Chap. 1
Jan. 10	Petroleum Reservoirs – Chap. 2
Jan. 13	Potential Fields – Chap. 3
Jan. 15	Cooperative Inversion of Geophysical Data – Chap. 24
Jan. 17	Refraction seismology – Chap. 4
Jan. 20	Reflection seismology – Chap. 5
Jan. 21	Lab. 1 – Joint inversion
Jan. 22	Seismic Resolution – Deconvolution and Migration
Jan. 24	Aliasing for the Layperson – Chap. 7
Jan. 27	Seismic Ties to Well Data – Chap. 8
Jan. 28	Lab. 2 – Raw Seismic Interpretation
Jan. 29	Character, Continuity, Coherency and Correlation – Chap. 9
Jan. 31	Pitfalls in Seismic Interpretation – Tucker and Yorston book examples
Feb. 3	Pitfalls in Seismic Interpretation – Chap. 10
Feb. 4	Lab.3 – – Pitfalls in Seismic Interpretation
Feb. 5	Multiples and Multiple Suppression
Feb. 7	Interpreting a Complex Structure –Chap. 11
Feb. 10	Sequence Stratigraphy – Chap. 12
Feb. 11	Lab 4 – Problems in Exploration Geophysics
Feb. 12	Midterm examination
Feb. 14	Review of Midterm examination
Feb. 16-23	Reading Week
Feb. 24	Carbonate Reef Interpretation – Chap.13
Feb. 25	Lab. 5 – Workstation Interpretation
Feb. 26	Interpretation of Salt Traps – Chap. 14
Feb. 28	Seismic Modeling – Chap. 15
Mar. 3	Seismic Inversion – Chap. 16
Mar. 4	Lab.5 – Workstation Interpretation
Mar. 5	Seismic Tomography – Chap. 17
Mar. 7	3-D Reflection Seismology – Chap. 18
Mar. 10	AVO – Chap. 19
Mar. 11	Lab. 5 – Workstation Interpretation
Mar. 12	Reservoir Geophysics – Chap. 20
Mar. 14	Time-lapse Seismology- Chap. 21
Mar. 17	Multicomponent Seismology-Chap 22
Mar. 18	Lab. 6 – Workstation exercise on seismic event picking
Mar. 19	VSP Methods – Chap. 23
Mar. 21	Geostatistics – Chap. 25
Mar. 24	The Art and Science of Contouring – Chap. 26
Mar. 25	Project presentations
Mar. 26	Seismic Visualization
Mar. 28	Concluding Remarks
Mar. 31	Project Presentations
Apr.1	Project Presentations
Apr. 2	Project Presentations
Apr. 4	Project Presentations
Apr. 7	Project Presentations
Apr. 8	Project Presentations
Apr. 9	Project Presentations
Apr. 11	Project Presentations
Apr. 14	Project Presentations