



UNIVERSITY OF CALGARY

DEPARTMENT OF GEOSCIENCE COURSE OUTLINE FALL 2015

1. **Course:** Geophysics 551, Seismic Theory and Methods

Lecture Sections:

L01: MoWeFr, 10:00-10:50, ST 128

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. E.S. Krebs, Office: ES 230, Ph. 403-220-5028, krebs@ucalgary.ca.

Office Hours: anytime I'm in the office and the door is open.

Desire 2 Learn (D2L) course name: F2015GOPH551L01

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

2. **Prerequisites:** Geophysics 355, Physics 321, 323, Mathematics 211, Applied Mathematics 415, and Mathematics 331. See also Geology [Course Descriptions](#) of the University Calendar.

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:

Lab Assignments (10)	30%
Midterm exam	30% (2 hours, Tuesday, Oct. 27, in lab)
Final Examination	40% (To be scheduled by the Registrar)

Each piece of work, e.g., assignment or exam(s), submitted by the student will be assigned a percentage score. The score for the exam(s) and the average score for the assignments will be combined with the weights indicated above to produce an overall percentage for the course, which will be used to determine the course letter grade. The conversion between course percentage and letter grade is given below. The lower number P in the A to D+ percent ranges below can be determined from the formula $P = 10 * GPV + 43$, where GPV is the grade point value of the letter grade.

Letter Grade	GPV	Percent	Letter Grade	GPV	Percent
A+	4.0	90-100	C+	2.3	66-70
A	4.0	83-90	C	2.0	63-66
A-	3.7	80-83	C-	1.7	60-63
B+	3.3	76-80	D+	1.3	56-60
B	3.0	73-76	D	1.0	50-56
B-	2.7	70-73	F	0.0	0-51

Scores within 0.5% of the upper boundary of a Percent range (e.g., 79.5%) may or may not be rounded up at the discretion of the instructor (a decision will be made based on the student's performance in the course). For percent grades on a boundary, the higher grade will be chosen (e.g., 73% is a B, not a B-).

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:** The main resource is a set of printed **Geophysics 551 Course Notes** available for purchase at the Bookstore.

6. **Examination Policy:** Closed-book. No calculators or any other electronic devices, unless otherwise announced. Formulas will be provided. Students should also read the Calendar, [Section G](#), on Examinations.

7. **Writing across the curriculum statement:** In this course, the quality of the student's writing in laboratory reports and exams 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 krebes@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.

TENTATIVE LECTURE SCHEDULE

Week of:	Topics
Sept. 8	Vectors, Tensors, Fourier Transforms (Chap. 1 of notes)
Sept. 15	Stress, Strain, and Seismic Waves (Chap. 2)
Sept. 22	Stress, Strain, and Seismic Waves (Chap. 2)
Sept. 29	Reflection and Transmission of Plane Waves (Chap. 3)
Oct. 6	Reflection and Transmission of Plane Waves (Chap. 3)
Oct. 13	Surface Waves, Head Waves, Normal Modes (Chap. 4)
Oct. 20	Surface Waves, Head Waves, Normal Modes (Chap. 4)
Oct. 27	Waves in Heterogeneous Media (Chap. 5)
Nov. 3	Waves in Heterogeneous Media (Chap. 5)
Nov. 10	Data Transformations (Chap. 6)
Nov. 17	Synthetic Seismograms (Chap. 7)
Nov. 24	Seismic Migration (Chap. 8)
Dec. 1	Plane Waves in Anisotropic Media (Chap. 9)

TENTATIVE LAB SCHEDULE

Date:	Topics
Sept. 9	No lab.
Sept. 16	Vectors, Tensors, Rotation of Coordinates, Fourier Transforms.
Sept. 23	Stress, Strain, Seismic Waves, Conservation of Energy, Mean Values, etc.
Sept. 30	Stress, Strain, Seismic Waves, Conservation of Energy, Mean Values, etc.
Oct. 7	Plane Wave Reflection and Transmission Coefficients.
Oct. 14	Plane Wave Reflection and Transmission Coefficients.
Oct. 21	No lab (mid-term exam week).
Oct. 28	Surface Waves, Dispersion Relations.
Nov. 4	Waves in Layered and Continuous Media, Ray Parameter.
Nov. 11	No lab. Remembrance Day Holiday.
Nov. 18	Data Transformations (e.g., Hilbert, frequency-wavenumber, and tau-p transforms).
Nov. 25	Synthetic Trace Calculations, Seismic Migration Calculations.
Dec. 2	No lab (last week of lectures).