



UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF GEOSCIENCE
COURSE OUTLINE

1. **Course:** GOPH 557, Multidimensional Data Analysis and Processing -- Winter 2018

Lecture 01: (MWF, 09:00-09:50 in SB144)

Instructor Name	Email	Phone	Office	Hours
Daniel Osvaldo Trad	daniel.trad@ucalgary.ca	403-2207375	ES 210	MWF- 12-1pm

Course Site:

D2L: GOPH 557 L01-(Winter 2018)-Multidimensional Data Analysis and Processing

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

Students must use their U of C account for all course correspondence.

2. **Prerequisites:**

See section [3.5.C](#) in the Faculty of Science section of the online Calendar.

Geophysics 517.

3. **Grading:**

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

Component(s)	Weighting %
Lab Papers (2)	10
Quizzes & Lab Skills exam (best 8)	40
Mid Term	15
Final exam - To be scheduled by the Registrar's office	35
Total	100

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component 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.

The conversion between a percentage grade and letter grade is as follows;

Letter Grade	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Minimum Percent Required	95	90	85	80	75	70	65	60	55	50	45

Each piece of work will be assigned a point score. All quizzes and Lab Skills questions are worth 10 points, Lab papers are 10 points, and the point score for midterm and finals varies. There will be 8 quizzes in total and two Lab Skills exams. Each lab Skills exam has two questions, each of which counts as a single quiz. Thus there are twelve possible quiz scores and only the 8 highest will be counted. The final course score is computed from

$$Course\ total = 10 * LP / 20 + 40 * Q / 80 + 15 * MT / MTT + 35 * F / FT$$

Where LP is the total points earned from both lab papers, Q is the total points earned from 8 best quizzes and Lab skills questions, MT is the earned Mid-term score, MTT is the total possible points on the Mid Term, F is the earned final exam score and FT is the total points possible on the final exam.

A student's 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. The conversion between course percentage and letter grade is given below.

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.3](#) of the University Calendar

5. **Scheduled out-of-class activities:**

There are no out-of-class activities scheduled for this course.

REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY. If you have a conflict with the out-of-class-time-activity, please contact your course coordinator/instructor no later than **14 days prior** to the date of the out-of-class activity so that alternative arrangements may be made.

6. **Course Materials:**

The course D2L site contains all of the handouts for labs, as well as other resource material that you might find useful. Including the textbook *Methods of Seismic Data Processing*, by Gary F. Margrave

7. **Examination Policy:**

All exams and quizzes are open book and open notes. You may bring any materials to the exam or quiz that you have created yourself. You may not bring copies of exams or quizzes from previous years. You are encouraged to bring a calculator or computer to the exam and use it for numerical computations. If you have Matlab on your computer you may use that but it is not required or necessary. During the examination period you may use any computer or calculator to compute numerical answers but you may not use email or access the internet. The only exception to accessing the internet is when you are asked to download materials from the course website. Students should also read the Calendar, Section G, on Examinations:

Students should also read the Calendar, [Section G](#), on Examinations.

8. **Approved Mandatory and Optional Course Supplemental Fees:**

There are no mandatory or optional course supplemental fees for this course

9. **Writing across the Curriculum Statement:**

For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of those reports. See also [Section E.2](#) of the University Calendar.

10. **Human studies statement:**

Students will not participate as subjects or researchers in human studies.

11. **Reappraisal of Grades:**

A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See [Section I.3](#) of the University Calendar.

1. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **15 days** of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall immediately submit the Reappraisal of Graded Term work form to the department in which the course is offered. The department will arrange for a re-assessment of the work if, and only if, the student has sufficient academic grounds. See sections [I.1](#) and [I.2](#) of the University Calendar

2. **Final Exam:** The student shall submit the request to Enrolment Services. See [Section I.3](#) of the University Calendar.

12. **OTHER IMPORTANT INFORMATION FOR STUDENTS:**

a. **Misconduct:** 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. Examples of academic misconduct may include: submitting or presenting work as if it were the student's own work when it is not; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; collaborating in whole or in part without prior agreement of the instructor; borrowing experimental values from others without the instructor's approval; falsification/ fabrication of experimental values in a report. **These are only examples.**

- 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 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 [procedure-for-accomodations-for-students-with-disabilities_0.pdf](#).

Students needing an accommodation in relation to their coursework or to fulfill requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Sr. Instructor of the Department of Geoscience, Dr. Rudi Meyer by email rmeyer@ucalgary.ca or phone 403-210-7848. Religious accommodation requests relating to class, test or exam scheduling or absences must be submitted no later than **14 days** prior to the date in question: <http://www.ucalgary.ca/pubs/calendar/current/e-4.html>

- d. **Safewalk:** Campus Security will escort individuals day or night (www.ucalgary.ca/security/safewalk/). Call [403-220-5333](tel:403-220-5333) 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 (FOIPPA). 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 www.ucalgary.ca/legalservices/foip.
- f. **Student Union Information:** [VP Academic](#), Phone: [403-220-3911](tel:403-220-3911) Email: suvpaca@ucalgary.ca. SU Faculty Rep., Phone: [403-220-3913](tel:403-220-3913) Email: sciencerep@su.ucalgary.ca. Student Ombudsman, Email: suvpaca@ucalgary.ca.
- g. **Internet and Electronic Device Information:** Unless instructed otherwise, cell phones should be turned off during class. All communication with other individuals via laptop, tablet, smart phone or other device is prohibited during class unless specifically permitted by the instructor. Students that violate this policy may be asked to leave the classroom. Repeated violations may result in a charge of misconduct.
- h. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction ([USRI](#)) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.
- i. **SU Wellness Center:** The Students Union Wellness Centre provides health and wellness support for students including information and counselling on physical health, mental health and nutrition. For more information, see www.ucalgary.ca/wellnesscentre or call [403-210-9355](tel:403-210-9355).

Department Approval:

Electronically Approved

Date: 2017-12-12 18:02

Course Outcomes

1. Explain the concepts and steps associated with 2D seismic data processing, e.g., scaling, velocity analysis, computing static and dynamic (normal move-out) time corrections, sorting and data gathers, stacking, frequency-wavenumber filtering, surface-consistent methods, seismic data migration using raytracing and using the wave equation, pre-stack migration.
2. Explain the various concepts and equations associated with 2D discrete and continuous signals, e.g., 2D Fourier transforms and frequency-wavenumber spectra, convolution, correlation, spatial aliasing, 2D filters, analyzing geophysical data in the frequency-wavenumber domain.
3. Mathematically calculate various quantities associated with 2D discrete and continuous signals, e.g., 2D Fourier transforms, convolutions, correlations, and filter components.
4. Use the equations and formulas from multidimensional data analysis and processing, and the related mathematics, to solve problems and derive new equations and formulas.
5. Write computer programs and use commercial mathematical and computational software to calculate various quantities, such as 2D Fast Fourier transforms, convolutions, correlations, and filter components, and to perform the data processing steps mentioned in outcome 1, and to solve problems in multidimensional geophysical data analysis and processing.