1. **Course:** Geophysics 557, Multidimensional Data Analysis and Processing

    Lecture Sections:

    L01: MoWeFr, 09:00-09:50, ENA 03
    For a listing of all lab sections corresponding with this course, please see the following link:
    http://geoscience.ucalgary.ca/geoscience_info/courses/w16

    Instructor: Wenyong Pan, Office: **ES 210**, Ph. 403-966-2801, wpan@ucalgary.ca, Office Hours: MWF 1-2pm

Lab/Time/Day/Loc:	B01	08:00 - 10:50	Th	ES 924
	B02	11:00 - 13:50	Th	ES 924
	B03	17:00 - 20:00	We	ES 924

    The course website can be found on D2L.
    Geoscience Department ES 118, 403-220-5841, geoscience.ucalgary.ca, geoscience@ucalgary.ca

2. **Prerequisites:** Geophysics 517. See section 3.5.C in the Faculty of Science section of the online Calendar (www.ucalgary.ca/pubs/calendar/current/sc-3-5.html)

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:

Grading Schedule	Percent
Lab Papers (2)	10%
Quizzes & LS Exams (best 8)	40%
Mid Term – March 2 2016	20%
Final exam – To be scheduled by the Registrar's office	30%
Total	100%

    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 9 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 thirteen possible quiz scores and only the 8 highest will be counted. The final course score is computed from

    $$Course\ total = 10 * \frac{LP}{20} + 40 * \frac{Q}{80} + 20 * \frac{MT}{MTT} + 30 * \frac{F}{FT}$$

    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.

Letter Grade	Percent	Letter Grade	Percent
A+	96-100	C+	60-64.9
A	90-95.9	C	50-59.9
A-	85-89.9	C-	45-49.9
B+	80-84.9	D+	44-44.9
B	70-79.9	D	40-44
B-	65-69.9	F	0-40

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

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. You are also required to obtain the two texts (available in the University Bookstore):
   Methods of Seismic Data Processing, by Gary F. Margrave

   Reading the course D2L page is not a substitute for attendance at lectures. The lectures provide an interactive environment that embellishes on, and provides a context for, the material in the textbook, whereas D2L is a live site that allows for tailoring and updating of the course material during the term. Failure to attend the lectures will put you at a serious disadvantage.

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 of 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:

8. **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

   (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. Krebes 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.

Department Approval: ORIGINAL SIGNED   Date: December 23, 2015

Tentative Lecture and Lab Schedule

Week of	Lecture Topic (ENA 03)	Labs (ES 0924)	Events
Jan 11	Course introduction, schedule, seismic data processing flow		
Jan 13	Review of wave equation, Helmholtz equation finite difference concepts	Labs begin Quiz 1	
Jan 15	Finite difference modeling		
Jan 18	F-K transforms, spatial aliasing (1)		
Jan 20	F-K transforms, spatial aliasing (2)	Quiz 2	
Jan 22	F-K transforms, spatial aliasing (3)		
Jan 25	Surface consistent methods (1)		
Jan 27	Surface consistent methods (2)	Quiz 3	
Jan 29	Statics and Datum (1)		
Feb 1	Statics and Datum (2)		
Feb 3	Velocities, Raytracing (1)	Lab skills exam 1	← a double quiz
Feb 5	Velocities, Raytracing (2)		
Feb 8	Velocities, Raytracing (3)		
Feb 10	NMO and Stacking (1)	Quiz 4	
Feb 12	NMO and Stacking (2)		
	Reading week	No Lab	No Class
Feb 22	NMO and Stacking (3)		Lab paper 1 deadline
Feb 24	Post-stack migration (1)	Quiz 5	
Feb 26	**Midterm Exam**		
Feb 29	Post-stack migration (2)		
March 2	Post-stack migration (3)	Quiz 6	
March 4	Post-stack processing		
March 7	Raytrace migration (1)		
March 9	Raytrace migration (2)	Quiz 7	
March 11	Raytrace migration (3)		
March 14	Constant-velocity migration and Huygens principle		
March 16	Impulse response and wavefront migration	Lab skills exam 2	← a double quiz
March 18	Exploding reflector model and F-K migration		
March 21	F-K migration		
March 23	F-K wavefield extrapolation (1)	Quiz 8	
March 25	F-K wavefield extrapolation (2)		
March 28	Wavefield extrapolation operator		
March 30	Phase-shift migration (1)		Lab paper 2 deadline
April 1	Phase-shift migration (2)		
April 4	Phase-shift migration (3)		
April 6	Reverse time migration		
April 8	Full-waveform inversion (1)		
April 11	Full-waveform inversion (2)		