



Course GEOS 5V08-024
Course Title Exploration Seismology
Professor Prof David Lumley
Term Spring 2018
Meetings Thursday 1.00-3.45pm ROC 2.301

Professor's Contact Information

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Office Hours Tuesday 2.00-4.00pm (by appt)
Other Information I don't read eLearning mail...

General Course Information

Pre-requisites, Co-requisites, & other restrictions Classical Physics, Linear Algebra, Calculus, PDE's, basic programming (e.g., Matlab, F90, or C). Attendance by approval of Instructor.

Course Description This course covers the fundamentals of Exploration Seismology including wave propagation, rock and fluid physics, seismic modeling, data acquisition, signal processing, imaging, time-lapse monitoring, and inversion (estimation of physical properties).
Students will learn the fundamental concepts underlying the mathematical and physical methods of seismic imaging and inversion. Emphasis is placed on physical intuition rather than overly complex mathematics.

Learning Outcomes Students will learn the fundamental concepts underlying the mathematical and physical methods of seismic imaging and inversion. Emphasis is placed on physical intuition rather than overly complex mathematics.

Required Texts & Materials No required textbook. Lecture handouts can be compiled in a binder to create a course book.

Suggested Texts, Readings, & Materials Exploration Seismology (Sheriff and Geldart), Imaging the Earth's Interior (Claerbout), Seismic Data Analysis (Yilmaz), The Rock Physics Handbook (Mavko et al.), Quantitative Seismic Interpretation (Avseth et al.).

Assignments & Academic Calendar

[Topics, Reading Assignments, Due Dates, Exam Dates]

Insert Week Number

OR Range of Dates TOPICS subject to change by Instructor

for week

Wk1 Exploration Seismology - Real Case Study
Wk2 Rock and Fluid Physics
Wk3 Seismic Data Acquisition
Wk4 Wave types, Reflection, Refraction
Wk5 Digital Signal Processing, Filters
Wk6 3D Seismic Data Processing
Wk7 3D Seismic Data Processing
Wk9 Wave Equations
Wk10 Seismic Modeling
Wk11 Wave-equation Imaging, Velocity Analysis
Wk12 Full Waveform Inversion (FWI)
Wk13 Amplitudes, AVO/A, Impedance Inversion
Wk14 Quantitative Interpretation (QI)

Wk15 4D Seismic Time-lapse Monitoring
Insert Exam Date(s), Midterm Exam March1 @ 1pm, Final Exam May3 @ 1pm
Time(s)

Course Policies

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|---|--|
| Grading (credit) Criteria | 40% Assignments + 20% Quizzes + 20% Midterm Exam + 20% Final Exam |
| Make-up Exams | TBD |
| Extra Credit | None |
| Late Work | Accepted only by pre-approval of Instructor. 10% grade penalty per day late. |
| Special Assignments | None |
| Class Attendance | Required |
| Classroom Citizenship | Professional conduct. No use of cell phones, social media etc. allowed in classroom (step outside if necessary) |
| Comet Creed | <i>This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:</i> "As a Comet, I pledge honesty, integrity, and service in all that I do." |
| UT Dallas Syllabus Policies and Procedures | <i>The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.</i> <i>Please go to http://go.utdallas.edu/syllabus-policies for these policies.</i> |

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.