

University of Alberta
ELECTROMAGNETIC AND POTENTIAL FIELD METHODS
GEOP424, Fall 2018

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Web Page <https://www.ualberta.ca/~unsworth/UA-classes/424/424index.html>
Office Hours Please contact me to make an appointment

Lecture schedule MWF 12:00 – 12:50, CCIS L1-029
Lab schedule Mondays 14:00 - 16:50. Location TBA
 Schedule will be posted on the class webpage.

Course Description

Theory and application of Maxwell's equations to geophysics; resistivity of rocks, electromagnetic exploration, magnetotellurics, frequency and time domain electromagnetic methods, forward and inverse techniques to image crustal and mantle structure. Analysis of electromagnetic data collected at field school.

Course Prerequisites: MATH337, PHYS 281, PHYS 381, GEOP 325.

It is important to prepare yourself for this course through a review of the prerequisite material. Students who do not have the required prerequisites at the time of taking this course should not expect supplementary professorial tutoring from the instructor.

Course Objectives and Expected Learning Outcomes

To learn the basic principles of electromagnetic (EM) exploration techniques, both those using naturally occurring EM signals and those using controlled sources. The course will cover the underlying physics, data interpretation and a review of common applications.

Recommended textbooks

- **Applied geophysics**, W.M. Telford, Cambridge University Press, 1995.
- **Practical magnetotellurics**, Fiona Simpson and Karsten Bahr, Cambridge University Press, 2005.
- **Electromagnetic methods in Applied Geophysics**, edited by Misac Naibighian, Society of Exploration Geophysicists, paperback edition 1994.

Past Evaluative Material:

Past exams and solutions can be found at :

<http://www.ualberta.ca/~unsworth/UA-classes/424/424index.html>

Grade Evaluation:

All assignments and examinations in this course will be given a numerical score in percent. A cumulative course mark will be calculated from those scores, weighted as tabulated below. A final letter grade will be assigned based upon the cumulative mark and the instructor's analysis of the cumulative mark distribution of the class. Where possible, natural breaks in the cumulative mark distribution will be used in assigning grades, but no pre-determined distribution of grades will be imposed on the class. Each student's final letter grade will reflect a combination of his/her absolute achievement and relative standing in the class. In past years, the class average in this course has been in the B range. The mean grade in this year will be based on the instructor's judgment of the overall caliber of this class relative to past years.

Grades will remain unofficial until approved by Faculty Council or its designate (i.e. Departmental Chair).

Activity	Weight	Time - date
Midterm exam	20%	14:00 – 15:30, Monday, October 22 2018
Labs	25%	During term
Assignments	15%	During term
Final Exam	40%	See BearTracks when Final Exam Schedule is posted

Format of Exams: See past evaluative material for sample exams.

Missed midterm exam:

- A student who cannot write the midterm exam due to compelling reasons, is required to complete a Statutory Declaration at the Student Services Office in the Faculty of Science, and present the paperwork to the professor.
- A missed midterm exam with a Statutory Declaration will have the weight of the midterm exam rolled into the final exam. In this case, the final exam will count for 60% of the total course grade.
- Deferral of the midterm exam is a privilege and not a right.
- Misrepresentation of Facts to gain a deferral is a serious breach of the *Code of Student Behaviour*.

Deferred Final Examination:

- A student who cannot write the final examination due to incapacitating illness or other compelling reasons can apply for a deferred final examination. Such an application must be made to the student's Faculty office within 48 hours of the missed examination and must be supported by a Statutory Declaration or other appropriate documentation (Calendar section 23.5.6).

- Deferred examinations are a privilege and not a right; there is no guarantee that a deferred examination will be granted. The deferred final examination is scheduled for Saturday, 19 January 2019, 09:00 - 12:00, CCIS L1-029
- Misrepresentation of facts to gain a deferred examination is a serious breach of the *Code of Student Behaviour*.

Deferred Final Examination

A student who writes the final examination and fails the course may apply for a reexamination. Reexaminations are rarely granted in the Faculty of Science. These exams are governed by University (Calendar section 23.5.5) and Faculty of Science Regulations (Calendar section 192.5.9). Misrepresentation of Facts to gain a reexamination is a serious breach of the *Code of Student Behaviour*.

Student Responsibilities:

ACADEMIC INTEGRITY: ‘The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (online at www.ualberta.ca/secretariat/appeals.htm) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.’ All forms of dishonesty are unacceptable at the University. Any offense will be reported to the Senior Associate Dean of Science who will determine the disciplinary action to be taken. Cheating, plagiarism and misrepresentation of facts are serious offenses. Anyone who engages in these practices will receive at minimum a grade of zero for the exam or paper in question and no opportunity will be given to replace the grade or redistribute the weights. As well, in the Faculty of Science the sanction for **cheating** on any examination will include a **disciplinary failing grade** (no exceptions) and senior students should expect a period of suspension or expulsion from the University of Alberta.

EXAMS: Your student photo I.D. is required at exams to verify your identity. Students will not be allowed to begin an examination after it has been in progress for 30 minutes. Students must remain in the exam room until at least 30 minutes has elapsed. Electronic equipment other than calculators cannot be brought into examination rooms and hats should not be worn.

CELL PHONES: Cell phones are to be turned off during lectures, labs and seminars. Cell phones are not to be brought to exams.

STUDENTS WITH DISABILITIES: Students who require accommodation in this course due to a disability are advised to discuss their needs with Specialized Support & Disability Services (2-800 Students’ Union Building).

ACADEMIC SUPPORT CENTRE: Students who require additional help in developing strategies for better time management, study skills or examination skills should contact the Academic Support Centre (2-703 Students' Union Building).

Policy about course outlines can be found in section 23.4(2) of the University Calendar.

Disclaimer: Any typographical errors in this Course Outline are subject to change and will be announced in class. The date of the final examination is set by the Registrar and takes precedence over the final examination date reported in this syllabus.

Note: Recording is permitted only with the prior written consent of the professor or if recording is part of an approved accommodation plan.

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