

EAS 105 The Dynamic Earth Through Time

3 Credits, 3 Hours Lecture, 3 Hours Lab per week

Official course description : The plate framework of a dynamic earth as it relates to the origin of major groups of minerals and rocks. Earthquakes, structural geology, and the origin of mountain belts. Surface processes and their sedimentary products. History of life and extinctions

Prerequisite: EAS 100 or 102

Instructor

Instructor: Neil O'Donnell

Office Location : S209G

Phone Number: 780-791-4821

email: neil.o'donnell@keyano.ca

Office Hours (Winter 2021)

| | |
|-----------|---------------|
| Wednesday | 10:00 – noon |
| Thursday | 10:00 – 11:00 |
| Thursday | 4:00 – 5:00 |
| Friday | 10:00 – 11:00 |

Other times are possible, by appointment

Hours of Instruction (Winter 2019)

| | |
|-----------|--------------------|
| Monday | 2:00 – 2:50 |
| Wednesday | 2:00 – 2:50 |
| Friday | 2:00 – 2:50 |
| Monday | 9:00 - 11:50 (lab) |

Required Resources

The Changing Earth, 7th edition, ISBN-13: 978-1-285-73341-8
Geological Highway Map of Alberta

Course Outcomes

Upon successful completion of this course, the student shall be able to:

- Describe the development and significance of plate-tectonic theory; show real examples of the role of tectonics in shaping the Earth; and relate tectonics to the geology of Canada.
- Properly use maps and examples to show geomorphology of tectonic zones and then calculate spreading / subduction rates.
- Learn the overarching classification scheme for minerals; understand the chemical nature of the main mineral groups; and understand the physical and chemical properties of the main rock-forming minerals.
- Develop basic skills in mineral description by investigating and reporting the physical characteristics of the main rock-forming minerals.
- Understand the role of igneous rocks and processes in the context of the rock cycle; describe and link magmatic processes in the context of plate tectonics; and learn the main igneous rock types and their relationship to plate tectonics.
- Develop basic skills in rock description by investigating and reporting the main igneous rock types.

- Learn and understand the range and style of rock deformation; link tectonics and rock deformation; study the range of deformed rock types and their significance in a paleogeographic context; and learn the main metamorphic rock types and their relationship to plate tectonics
- Understand the role of soil / sediment / sedimentary rocks and sedimentary / geomorphological processes in the context of the rock cycle; describe the main weathering and material transport mechanisms observed on Earth's surface; and learn the main sedimentary rock types and their relationship to plate tectonics.
- Learn and understand the geological time scale; review the general geological characteristics of the geological periods; and interpret relative age relationships from geological maps.
- Develop an appreciation of geological time and the relative apportionments of Earth's geological phases with respect to absolute time; also to memorize aspects of the geological time scale.
- Learn and understand the geological character of Precambrian Earth, the paleontological database of ancient life, craton-configuration components, and examples of various shield rocks.
- Learn and understand the evolution of Earth's surface during the Phanerozoic eon in the context of plate tectonics, the paleontology of time-scale periods, and continent configuration and life.
- Develop basic skills in fossil description by describing and sketching the typical fauna (from fossil examples) of the different periods.

Evaluation

| | |
|--------------------------------------|--------------|
| Labs (9) & Assignments (2) | 30 % |
| On-Line Quizzes (by Chapter) | 5 % |
| 1 st Half Exam (Week 6) | 10 % |
| 2 nd Half Exam (Week 13) | 10 % |
| Final Exam | 45 % |
| Total | 100 % |

Grading System

| Descriptor | Alpha Grade | 4.0 Scale | Percent | Rubric for Letter Grades |
|---------------------|--------------------|-----------|-----------|--|
| Excellent | A+ | 4.0 | > 92.9 | Work shows in-depth and critical analysis, well developed ideas, creativity, excellent writing, clarity and proper format. |
| | A | 4.0 | 85 – 92.9 | |
| | A- | 3.7 | 80 – 84.9 | |
| Good | B+ | 3.3 | 77 – 79.9 | Work is generally of high quality, well developed, well written, has clarity, and uses proper format. |
| | B | 3.0 | 74 – 76.9 | |
| | B- | 2.7 | 70 – 73.9 | |
| Satisfactory | C+ | 2.3 | 67 – 69.9 | Work has some developed ideas but needs more attention to clarity, style and formatting. |
| | C | 2.0 | 64 – 66.9 | |
| | Progression | C- | 60 – 63.9 | |
| Poor | D+ | 1.3 | 55 – 59.9 | Work is completed in a general way with minimal support, or is poorly written or did not use proper format. |
| Minimum Pass | D | 1.0 | 50 – 54.9 | |
| Failure | F | 0.0 | < 50 | Responses fail to demonstrate appropriate understanding or are fundamentally incomplete. |

- A grade of C- is required for progression or transfer.
- The minimum standard for passing this course is a grade of D (50%).
- Students must achieve an average of 50% on the midterm and the final exam in order to pass the course and an overall average in the course of 50% (D).

Term Mark (labs, assignments, on-line quizzes)

- Term Mark will be determined from all the labs, reports, and assignments.
- Term Mark will be weighted average of all submissions.
- If 20% or more of submissions (labs, reports, and assignments) are missing, student will not be allowed to write the final exam. This rule applies, even if the submission has a zero grade.

Mid-Term and Final Exams

- Two mid-term exams will be given:
 - Week 6 - covers lecture materials Weeks 1-6.
 - Week 13 - covers lecture materials Weeks 8-13.
- Mid-term exams will not be deferred.
 - If missed for an “excused absence”, the percentage will be integrated into the final exam percentage.
 - If missed otherwise, the mark will be zero.
- Final exam covers lecture materials Weeks 1-15, and associated lab materials..

Lab Sessions

Laboratory work will be conducted weekly starting Monday, January 11 (possibly January 18), 2021. Lab protocol will be explained during the first lecture in Week 1, 2021. Labs will be graded. Completion of the labs and a passing grade on that component of the course are considered mandatory to pass EAS 105.

The labs will run 3 hours per week. Attendance is mandatory. To get credit for a lab, you must attend the scheduled lab session. If you are absent, the mark recorded will be zero.

For laboratory work in this course, the observations you record must be made individually by you. All lab observations and notes must be completed in the lab. You must carry out all calculations yourself, and written answers must be in words composed uniquely by you. Refer to remarks below on Page 5.

Students present for the lab should hand in completed reports or assignments at the end of **that** lab session, or no later than one week following, with no penalty. After one week, a mark of zero will be assigned.

Unless specified differently by the instructor, labs, reports, and assignments will be submitted electronically via Moodle.

Any changes due to special circumstances will be communicated by instructor to students via Moodle.

Proposed Schedule of Topics (Lectures)

1. Introduction
 - Preamble and introduction to the course; study of the Earth as a heat engine.
 - Review rock cycle.
2. Tectonic Framework and the formation of Lithosphere (1 week)
 - Plate boundaries and their characteristic processes
 - Examples of the products of plate tectonics
 - Plate tectonics and the Geology of Canada
3. Minerals (1 week)
 - Main groups and classification of minerals
 - Chemical composition and structures of major mineral groups
 - Physical and chemical properties of rock-forming minerals
4. Igneous processes including intrusive activity and volcanism (1 week)
 - Igneous processes and rocks
 - Magmatic processes and their relationship to tectonic setting
 - Classification and identification of igneous rocks
5. Structural Geology (1 week)
 - Deformation processes
 - Identification and characteristics of major structures: folds, faults, etc.
 - Tectonic interpretation of structures; orogens and orogenic belts

6. Metamorphism and metamorphic rocks (1 week)
 - Causes and types of metamorphism
 - Plate tectonic context of metamorphism
 - Major types of metamorphic rocks and their characteristics
7. Processes at the Earth's surface (2 weeks)
 - Weathering and soil
 - Flow and transport of sediment by air, water, and ice
 - Main types of sediment and sedimentary rock
 - Sedimentary environments and their tectonic setting
 - Unconformities
8. The geological timescale (1 week)
 - Introduce the geological timescale and the main subdivisions of geologic time
 - Review methods of stratigraphic correlation and measuring of geologic time
9. Precambrian Earth and life, Canadian Shield (1 week)
 - Characteristics of the Precambrian Earth
 - Paleontological database of Precambrian life
 - Major elements of the Canadian Shield
10. Paleozoic Earth and life (1 week)
 - Continental margins of North America in the Paleozoic
 - Major groups of fossils from the Paleozoic
11. Mesozoic and Cenozoic Earth and life (1 week)
 - History of North America in the Mesozoic and Cenozoic; Rocky Mountains
 - Major groups of Mesozoic fossils: dinosaurs, invertebrates
 - Major Cenozoic fossils: mammals
 - History of Glaciation

Proposed Schedule of Laboratories

Ensure all students have Keyano-specific WHMIS certification.

- Lab 1. Plate tectonics: Use maps and examples to show geomorphology of tectonic zones and then calculate spreading / subduction rates. Association with metamorphic zones (e.g. Barrovian sequence).
- Lab 2. Minerals and their atomic structure: Develop basic skills in mineral description by investigating and reporting the physical characteristics of the main rock-forming minerals.
- Labs 3 & 4. Rocks: Develop basic skills in rock description by investigating and reporting the main rock types.
- Lab 5. Barrovian Sequence: study the Barrovian sequence and its role in metamorphism.
(Reading break)
- Lab 6. The Geological Time scale: Develop an appreciation of geological time and the relative apportionments of Earth's geological phases with respect to absolute time; also to memorize aspects of the geological time scale.
- Lab 7. Precambrian Earth and life, Canadian Shield: Precambrian fossils, configuration of cratons, examples of shield rocks.
- Lab 8. Paleozoic Earth and life; the Paleozoic of North America: Develop basic skills in fossil description by describing and sketching the typical fauna (from fossil examples) of the periods.
- Lab 9. Mesozoic Earth and life; the Mesozoic of North America: Develop basic skills in fossil description by describing and sketching the typical fauna (from fossil examples) of the periods.
- Lab 10. Cenozoic Earth and life; the Cenozoic of North America: Develop basic skills in fossil description by describing and sketching the typical fauna (from fossil examples) of the periods. Includes Pleistocene and Holocene Earth and life. Glaciation.
- Lab 11. NO NEW LAB. Final Lab class. Review session for lab topics.

Please Note:

Date and time allotted to each topic is subject to change.

Performance Requirements and Student Services

Student Responsibilities

It is your responsibility as a student to contact the Office of the Registrar to complete the forms for Withdrawal or Change of Registration, and any other forms. Please refer to the list of important dates as noted in the Academic Schedule in the [Keyano College credit calendar](#). The Keyano College credit calendar also has information about Student Rights and Code of Conduct. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Code of Conduct Policies.

Student Attendance

Class attendance is useful for two reasons. First, class attendance maximizes a student's learning experience. Second, attending class is a good way to keep informed of matters relating to the administration of the course (e.g., the timing of assignments and exams). Ultimately, you are responsible for your own learning and performance in this course.

It is the responsibility of each student to be prepared for all classes. Students who miss classes are responsible for the material covered in those classes and for ensuring that they are prepared for the next class, including the completion of any assignments and notes that may be due.

Academic Misconduct

Students are considered to be responsible adults and should adhere to principles of intellectual integrity. Intellectual dishonesty may take many forms, such as:

- Plagiarism or the submission of another person's work as one's own;
- The use of unauthorized aids in assignments or examinations (cheating);
- Collusion or the unauthorized collaboration with others in preparing work;
- The deliberate misrepresentation of qualifications;
- The willful distortion of results or data;
- Substitution in an examination by another person;
- Handing in the same unchanged work as submitted for another assignment; and
- Breach of confidentiality.

The consequences for academic misconduct range from a verbal reprimand to expulsion from the College. More specific descriptions and details are found in the Student Rights and Code of Conduct section of the Keyano College credit calendar. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Code of Conduct Policies.

In order to ensure your understanding of the concept of plagiarism, you must successfully complete the online tutorial found on ilearn.keyano.ca. Then print the certificate, sign it, and show it to each of your instructors. Your course work may not be graded until you show this signed certificate.

Specialized Supports

The Student Services department is committed to Keyano students and their academic success. There are a variety of student supports available at Keyano College. Due to the continuing situation with the Covid-19 pandemic, the offered support services will be implemented differently this semester by being provided mostly virtually. In-person service can be requested as needed. All Alberta Health Services guidelines will be followed for in-person appointments—wear a mask, maintain two meters of physical distance, use hand sanitizer, and stay home if you are unwell.

All student services are available during Keyano business hours: Monday to Friday, 8h30-16h30.

Accessibility Services: provides accommodations for students with disabilities. Students with documented disabilities, or who suspect a disability, can meet with a Learning Strategist to discuss their current learning barriers and possible accommodations. Students who have accessed accommodations in the past are encouraged to contact us to request them for the semester. Please

note that requesting accommodations is a process and requires time to arrange. Contact us as soon as you know you may require accommodations. For accessibility services supports and to book a virtual appointment, please contact accessibility.services@keyano.ca.

Accessibility Services also provides individual and group learning strategy instruction for all students, as well as technology training and supports to enhance learning. Meet with a Learning Strategist to learn studying and test-taking strategies for online classes. Schedule an appointment with the Assistive Technology Specialist to explore technology tools for learning. Book an appointment today by emailing accessibility.services@keyano.ca

Wellness Services: offers a caring, inclusive, and respectful environment where students can access free group and individual support to meet academic and life challenges. Mental Health Coordinators offer a safe and confidential environment to seek help with personal concerns. All individual appointments will continue virtually.

Wellness Services welcomes students to participate in any of the virtual group sessions offered throughout the academic year addressing topics including mindfulness and test anxiety.

Individual virtual appointments can be made by emailing wellness.services@keyano.ca.

Library Services: provides students with research and information supports as they engage in their studies. Library staff are available to support you both virtually and in person throughout the semester. For a detailed list of library supports and services, go to www.keyano.ca/library. For any inquiries, please email askthelibrary@keyano.ca.

Begin your research with the [Library's FIND page](#). Search for sources using OneSearch, the Library's Catalogue, or by searching in a specific database selected from the [A-Z Database List](#).

Individual support with the Information Librarian is available virtually. Appointments can be requested by using the [Book A Librarian online form](#).

Research and Subject Guides are helpful resources when beginning your research or addressing other information needs. To view a subject or course specific guide, go to the Subject Guide webpage [here](#).

To access additional research resources, including Citation Guides (APA, MLA, Chicago, or IEEE), go to the [Research Help Library page](#).

The Loanable Technology collection is available to support students in their online learning pursuits. Items available for borrowing include mobile projectors, webcams, noise cancelling headphones, Chromebooks, and laptops. For an up-to-date list of technology available for borrowing, go to the Library's [Loanable Technology webpage](#).

Skill Centre: Provides academic support services to students registered in credit programs at Keyano College in the form of tutoring, assignment/lab support, writing support groups, facilitated study groups, workshops, and study space. This service is free and is available for all Math, Sciences, Humanities and Trades courses offered at Keyano.

While most courses are being offered online, the Skill Centre will be offering mostly virtual services and in-person sessions as requested. Please email Skill@keyano.ca to get in contact with our Academic Content Specialists. The Skill Centre is located in CC-119 at the Clearwater Campus.

For the most up to date information on how to book a session, please view the [Keyano Skill Centre homepage](#).

Academic Success Coaching: offers you support and access to resources for your academic success to help you to find the Keys to your Success. The Academic Success Coach will work with you to develop an academic success plan, develop your study and time management skills, and connect you with the right resources here at Keyano. Academic.success@keyano.ca is the best way to access resources during virtual service delivery. The Academic Success Coach is located in the Skill Centre in CC-119 at the Clearwater Campus.

E-Learning

Technology and internet will impact your online learning experience. It's important that you are able to watch an online video and other course materials, take online quizzes, and participant in a live class with your instructor and other students.

Keyano College operates in a Windows based environment and having the correct tools for online learning is important. Here's a list of recommended system requirements.

Internet Speed

Minimum Internet speeds of 5 Mbps.

Recommended Internet speeds of 25 Mbps (especially if you are sharing your internet at home).

Check your internet speed with Fast.com.

System requirements:

| Microsoft Windows | Apple |
|---|--|
| <p>Minimum Requirements:</p> <ul style="list-style-type: none"> · A Windows 10 computer/laptop · Minimum 4GB of RAM. · 10GB+ available hard drive storage. · Enough available hard drive space to install the Microsoft Office suite (approximately 3GB). <u>Microsoft Office</u> software is free to all Keyano students and employees. · Microphone, webcam and speakers. A headset with a microphone is recommended. · System updates must be regularly installed. · Anti-Virus / Anti-Malware software | <p>Minimum Requirements:</p> <ul style="list-style-type: none"> · A Macintosh (V10.14 and above) computer/laptop · Minimum 4GB of RAM. · 10GB+ available hard drive storage. · Enough available hard drive space to install the Microsoft Office suite (approximately 3GB). <u>Microsoft Office</u> software is free to all Keyano students and employees. · Microphone, webcam and speakers. A headset with a microphone is recommended. · System updates must be regularly installed. · Anti-Virus / Anti-Malware software. |
| <p>Recommended Requirements</p> <ul style="list-style-type: none"> · 8GB of RAM · A method of backing up/synchronizing to local or cloud-based storage such as OneDrive is highly recommended. This is included if you complete the setup of KeyanoMail and download MS Office using your Keyano email for free. | <p>Recommended Requirements</p> <ul style="list-style-type: none"> · 8GB of RAM · A method of backing up/synchronizing to local or cloud-based storage such as OneDrive is highly recommended. This is included if you complete the setup of KeyanoMail and download MS Office using your Keyano email for free. |

Chromebooks are **not** recommended as they are not compatible with testing lockdown browsers.

A Microsoft Surface or iPad or iPad Pro may be possible alternatives in some program areas.

Specific Department Requirements:

Business and OA programs require Windows 10.

Other programs may utilize Windows based tools as well.

Computer Software

Students will be able to get access to Microsoft Office 365 for free using Keyano credentials by [clicking here](#).

Recording of Lectures and Intellectual Property

Students may only record a lecture if explicit permission is provided by the instructor or by Accessibility Services. Even if students have permission to record a lecture or lecture materials, students may not share, distribute, or publish any of the lectures or lecture materials, this includes any recordings, slides, instructor notes, etc. on any platform. Thus no student is allowed to share, distribute, publish or sell course related content (instructor, or students) without permission. It is important to recognize that the Canadian Copyright Act contains provisions for intellectual property. The [Academic Integrity Policy](#) provides additional information on Keyano College's expectations from students as members of the intellectual community.

ITS Helpdesk

If you are having issues with your student account, you can contact the ITS Helpdesk by emailing its.helpdesk@keyano.ca or calling 780-791-4965.