

**ES 1023a / ES 2123a**  
**Planet Earth: Shaken and Stirred / The Dynamic Earth**  
**Fall 2018**

**Location:**

**Lectures (1023a + 2123a):**

Tuesday & Thursday 10.30–11.30

UCC 146

**1023a labs:**

Section 002 Monday 11:30–13:30

B&GS-1053

Section 003 Monday 13:30–15:30

B&GS-1053

Section 004 Thursday 13:30–15:30

B&GS-1053

**2123a Labs:**

Section 002 Monday 15:30-17:30

B&GS-1053

Section 003 Friday 11:30-13:30

B&GS-1053

Computer-based labs  
will be in computer labs –  
locations will be given on OWL

**Instructor:**

Prof. Rick Secco

**Office:**

Room 0178

**Email:**

[secco@uwo.ca](mailto:secco@uwo.ca)

**Phone:**

519-661-4079

**Office Hours:**

email me for an appointment, or please come by my office

**TAs:**

TBA

**Course Calendar Description for ES 1023a/b:**

An overview of the origin and development of Earth and Solar System; constitution and active processes of Earth interior; how these processes have shaped Earth evolution in the past and how they continue to control surface phenomena such as earthquake and volcanic activity. Labs will introduce the main resource exploration techniques.

Prerequisites - None; Antirequisites – ES 2123a/b and the former Earth Sciences 085a/b.

**Course Calendar Description for ES 2123a/b:**

An introduction to the Earth as a large heat engine; topics will focus on large-scale dynamic processes that occur in the deep interior (mantle and core convection) and their relation to activity and phenomena on the face of the Earth (tectonic plate motions, plate interactions, earth magnetic field, etc.).

Prerequisites - None; Antirequisites – ES 1023a/b and the former Earth Sciences 085a/b.

## **Course Description:**

In this course, we explore the origin and development of Earth, its place in the Universe, its internal structure and the dynamics of its solid and liquid parts. The goal of this course is to enhance students' understanding of *how* our planet was formed, *how* it works, and *why* this is important to know. This course will focus on the following topics:

## **Anticipated Lecture Topics :**

ES1023a / 2123a is a course about planet Earth. The topics listed below may be adjusted slightly to reflect lecture progress or to introduce new and exciting developments in the field.

- Building blocks of planets, stars and galaxies.
- Origin and history of the Earth.
- The structure of the Earth – from core to crust.
- Exploring Earth's interior – seismology, gravity and geomagnetism.
- Dynamic processes that modify the Earth's surface – plate tectonics, volcanism, and earthquakes.

Geophysical field techniques form a major part of the laboratory work, which involves a two-hour laboratory session weekly.

## **Course Objectives:**

Upon successful completion of this course, students will be able to:

- \* Explain the basic processes of how the planets in our solar system developed
- \* Describe the interior structure of the Earth from crust to core
- \* Explain the basics of how seismology is used to determine Earth structure
- \* Explain how the geomagnetic field is generated in the core and what it means to survival of life on the surface
- \* Explain the basic processes of plate tectonics and place it in the context of the heat engine Earth and general Earth dynamics
- \* Explain the basic physical processes and characteristics of earthquake and volcanic event generation
- \* Through knowledge gained in laboratory exercises, employ basic geophysical exploration techniques

## Course Materials / Course Website:

Students should check OWL (<http://owl.uwo.ca>) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class. Students are responsible for checking OWL on a regular basis.

Textbook: There is currently no textbook for this course. Material will be presented during lectures in the form of electronic presentations and handouts, and posted on OWL. Complete lecture notes will be absolutely necessary for success in this course!

Lab Manual: Will be provided on-line via OWL.

For additional (optional) reading, the following reference books are available in the Taylor (Science) Library:

*The Dynamic Earth: An introduction to physical geology*, B. J. Skinner and S. C. Porter.

*Earth Science*, E.J. Tarbuck and F.K. Lutgens.

*The Earth's Dynamic Systems: A textbook in physical geology*, W. K. Hamblin.

*Physical Geology*, C. C. Plummer and D. McGeary.

## Course Evaluation:

Midterm test (in-class – late October or early November, 2018)

30%

Final exam (December 2018; scheduled by registrar's office) 45%

Essay (for ES2123a students only)\* Grade (10%) included with final exam

Laboratory reports 25%

100%

Laboratory reports are due one week after the specific session. **Laboratory attendance is mandatory.** Documentation for missed labs will be required and rescheduling into other sessions for the same week must be arranged specifically with the laboratory instructors. Any missed lab for which a student has an acceptable reason, and for which the student was unable to switch to another lab section in the same week, may be replaced by an extra lab to be posted on-line via OWL at the end of November. This make-up lab will be due the first week of December.

\*Essay: As part of the course requirements for students enrolled in ES 2123a, each student will submit an original essay of her/his own effort on any topic within the context of the course that highlights the Earth as a dynamic planet. The grade assigned for the essay will contribute to 10% of the final grade for the course. It will be combined in the final exam grade for a total of (i.e., exam + essay =) 45%. Further details on the essay subject will be available on OWL in due course.

It is Faculty of Science policy that a student who chooses to write a test or exam deems themselves fit enough to do so, and the student must accept the mark obtained. Claims of medical, physical, or emotional distress after the fact will not be considered.

**Late Policy:** Labs and the essay are due on the date specified on the assignment. 10% will be deducted for every day late. If you have exceptional circumstances, please contact Dr. Secco prior to the due date.

### **Missed Course Components:**

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or supporting documentation to the Academic Counselling Office of your home faculty as soon as possible.

If you are a Science student, the Academic Counselling Office of the Faculty of Science is located in NCB 280, and can be contacted at 519-661-3040 or scibmsac@uwo.ca.

Their website is [http://www.uwo.ca/sci/undergrad/academic\\_counselling/index.html](http://www.uwo.ca/sci/undergrad/academic_counselling/index.html).

A student requiring academic accommodation due to illness must use the Student Medical Certificate ([https://studentservices.uwo.ca/secure/medical\\_document.pdf](https://studentservices.uwo.ca/secure/medical_document.pdf)) when visiting an off-campus medical facility.

For further information, please consult the university's medical illness policy at [http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/accommodation\\_medical.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf).

If you miss the Midterm Test or the Final Exam, please contact your faculty's Academic Counselling Office as soon as you are able to do so. They will assess your eligibility to write a Make-up Midterm Test (if offered; if not offered, then re-weighting may be applied) or a Special Exam (the name given by the university to a makeup Final Exam). You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (see [http://www.registrar.uwo.ca/examinations/exam\\_schedule.html](http://www.registrar.uwo.ca/examinations/exam_schedule.html)).

**Electronic Devices:** Cell phones, music players and cameras will not be used during class time or during midterm/exam.

### **Academic Offences:**

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

[http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf)

All required papers may be subject to submission for textual similarity review to the commercial plagiarism-detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

### **Support Services:**

Learning-skills counsellors at the Student Development Centre (<http://www.sdc.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Students who are in emotional/mental distress should refer to Mental Health@Western ([http://www.health.uwo.ca/mental\\_health](http://www.health.uwo.ca/mental_health)) for a complete list of options about how to obtain help.

Additional student-run support services are offered by the USC, <http://westernusc.ca/services>.

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

### **Accessibility :**

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 ext. 82147 if you have questions regarding accommodation.

### **Medical Issues:**

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the Dean's office of your Faculty as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from your Dean's Office immediately. For further information please see: <http://www.uwo.ca/univsec/handbook/appeals/medical.pdf>

A student requiring academic accommodation due to illness, should use the Student Medical Certificate when visiting an off-campus medical facility or request a Records Release Form (located in the Dean's Office) for visits to Student Health Services.

For UWO Policy on Accommodation for Medical Illness and a downloadable SMC see: [https://studentservices.uwo.ca/secure/medical\\_document.pdf](https://studentservices.uwo.ca/secure/medical_document.pdf)

Students seeking academic accommodation on medical grounds for any missed tests, exams, participation components and/or assignments worth 10% or more of their final grade must apply to the Academic Counselling office of their home Faculty and provide documentation. Academic accommodation cannot be granted by the instructor or department.

For components or assignments worth less than 10%, individual arrangement will be made between the student and instructor.

### **Science Student Council Support :**

This course is supported by the Science Student Donation Fund. If you are a BSc or BMSc student registered in the Faculty of Science or Schulich School of Medicine and Dentistry, you pay the Science Student Donation Fee. This fee contributes to the Science Student Donation Fund, which is administered by the Science Students' Council (SSC). One or more grants from the Fund have allowed for the purchase of equipment integral to teaching this course. You may opt out of the Fee by the end of September of each academic year by completing paperwork in the Faculty of Science's Academic Counselling Office. For further information on the process of awarding grants from the Fund or how these grants have benefitted undergraduate education in this course, consult the chair of the department or email the Science Students' Council at [ssc@uwo.ca](mailto:ssc@uwo.ca).