

Earth Sciences 1086a: **Origin and Geology of the Solar System**

(Course Outline – Summer term 2026)

1. Course Information

ES1086a – Origin and Geology of the Solar System

Academic Term: Summer 2026

Delivery Mode: Fully asynchronous via OWL Brightspace

List of Pre-requisites: none.

List of Anti-requisites: Astronomy 2022A/B (please refer to the UWO Calendar).

Unless you have either the requisites for this course or written special permission from your Dean’s Designate (Department/Program Counsellors and Science Academic Advisors) to enroll in it, you may be removed from this course, and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

2. Instructor Information

Instructor	Email	Office	Phone	Office Hours
Prof. Robert Shcherbakov (Course Instructor)	rshcherb@uwo.ca	B&GS 1080	x84212	By appointment
TA: TBA				

I encourage you to post questions about the course content in the online Forums, as this allows everyone in the class to benefit from the questions and answers. If you need to contact me about something personal or confidential, please email me at rshcherb@uwo.ca

Students must use their Western (@uwo.ca) email addresses when contacting their instructor or TAs and put the course code (ES1086) in the subject line. Please read the syllabus before asking or posting a question.

Office hours – There are no regular office hours. Your first contact point will be your TA. If you need to speak with me, please send me an email and I’ll set up an appointment to meet over Zoom or Teams.

Steps to follow if you have questions:

1. Read this document (the syllabus) before asking or posting a question. Many FAQs are addressed here.
2. Email the TA. They are the first point of contact.
 - a. Put “ES1086” in the subject line.
 - b. Short emails (1-2 sentences) are easier to read and respond to.
3. If you need to speak with me, send me an email.
 - a. Put “ES1086” in the subject line.
 - b. Short emails (1-2 sentences) are easier to read and respond to.
 - c. I will do my best to respond in a timely manner.

- d. I will not respond to emails over the weekend.
- 4. If we need to meet, I'll schedule an appointment to meet over Zoom or Teams.

3. Course Syllabus, Schedule, Delivery Mode

This half-course explores our current understanding of the origin and evolution of the Solar System, including some observations about our Universe and the Milky Way Galaxy. We will examine the hypothesis and theories that attempt to explain the formation and geological evolution of the Sun, planets, moons, asteroids, comets, and meteorites. Particular attention is given to why and how Earth evolved along a path that is fundamentally different from the other planets. Throughout the course, students will be introduced to the scientific reasoning behind planetary science: how ideas develop over time, how hypotheses are tested, and how new data refine or reshape existing theories. By applying geological principles learned on Earth to other planetary bodies, students will gain insight into comparative planetology and the broader context of Earth within the Solar System. The course concludes with a discussion of the potential for life beyond Earth. As technology improves and as more and more space vehicles probe beyond Earth, knowledge expands dramatically. This course emphasizes qualitative understanding and scientific reasoning and is designed to be accessible to students from all academic backgrounds.

Course Objectives and Learning Outcomes:

The objectives of this course are to:

- Introduce students to our current understanding of the Solar System and how this knowledge has been developed;
- Provide an overview of the formation and evolution of stars and planetary systems;
- Highlight the diversity of planetary bodies and recognize that Earth’s geological history is not universally applicable;
- Familiarize students with the logical structure of scientific investigation, from observation and data collection to hypothesis development and theory refinement.

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

- Describe the origin and structure and major components of the Solar System;
- Explain the physical processes that shape planets, moons, asteroids, and comets;
- Apply fundamental concepts from Earth sciences to the study of other planetary bodies;
- Evaluate scientific hypotheses using observational and experimental evidence;
- Communicate scientific ideas clearly and effectively in written scientific format.

Important Dates (all dates and deadlines are Eastern Standard Time):

<i>Classes begin</i>	Monday, May 4
<i>Forums</i>	
Forum 0	
Forum for Unit #1	Friday, May 15 @ 6:00 pm
Forum for Unit #2	Friday, May 22 @ 6:00 pm
Forum for Unit #3	Friday, June 5 @ 6:00 pm
Forum for Unit #4	Friday, June 19 @ 6:00 pm
Forum for Unit #5	Friday, July 3 @ 6:00 pm
Forum for Unit #6	Friday, July 10 @ 6:00 pm

Quizzes	Forum for Unit #7	Friday, July 17 @ 6:00 pm
	Academic Integrity Quiz (Mandatory)	Friday, May 15 @ 3:30 pm
	ProctorTrack Onboarding (Mandatory)	Monday, June 1 @ 3:30 pm
	Quizzes 1, 2, 3, 4	Monday, June 8 @ 3:30 pm
Exams	Quizzes 5, 6, 7, 8	Wednesday, July 22 @ 3:30 pm
	Mid-term Exam	Thursday, June 11 @ 1:30-3:30 pm (EST) tentative
	Mid-term makeup Exam*	Thursday, June 18 @ 1:30-3:30 pm (EST) tentative
	Final Exam	TBD set by the Registrar's office (July 28 to 31)
Classes end		Friday, July 24

*The makeup is only available to students with an approved accommodation from your faculty councillors. If you miss the makeup and have an approved accommodation, you will be able to write the mid-term the next time the course is run. This is the only makeup available. No exceptions.

Delivery Mode:

- The course content is entirely on-line and mostly asynchronous. Asynchronous means you set your own schedule.
- Chapters are provided as PDF files. A suggested reading schedule is provided below.
- Quizzes are on-line and asynchronous (not timed).
- Exams will be synchronous, on-line, timed, closed book and proctored. This means you need to write the exam online at the scheduled time.

4. Course Materials

All course material will be posted to OWL Brightspace: <https://westernu.brightspace.com/> There is no required textbook. Read course materials. It is recommended that you read the study guides and have them out while you do the readings (OWL ▶ Content ▶ Course Information ▶ Reading and Studying the Material). This will help you pass the tests.

About OWL Brightspace:

Students are responsible for checking the course OWL site (<https://westernu.brightspace.com/>) regularly for news and updates. This is the primary method by which information will be disseminated to all students in the class.

Technical requirements:

- Access to a stable internet connection for the course duration (YOU MUST HAVE INTERNET ACCESS). The library is a great resource if you are having internet issues.
- A computer with a working webcam and microphone (not a tablet, nor iPad)
- iPads are not supported
- It is YOUR responsibility to be able to take and complete the exams

If students need assistance with the course OWL site, they can seek support on the [OWL Brightspace Help](#) page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

Course Outline and suggested weekly schedule:

Read the Syllabus, introductory materials and familiarize yourself with course site on OWL Brightspace. Each Unit contains an Introduction, unit Chapters, a Forum, a Self-Test (optional), and a Graded Quiz. The “Learning Goals” in the Unit Introductions are a starting point for you to begin your studies. More detailed information on what to study is provided in the “Study Guides” that can be found in the section “Reading and Studying the Material” under the Course Notes.

This is a suggested schedule, but you should plan your own schedule according to your reading speed and your other obligations. There are two weeks without suggested readings to allow time to catch up on readings and study for the midterm. Plan ahead, read regularly and keep up with the chapters each week.

Units	Description	Weeks	Actions and Deadlines
Unit 1	Basic Concepts	Week 1	Starts May 4th, 2026 (36 pages)
	Unit 1 Introduction		Read the introduction
Chapter 1:	Scientific Theory and the Big Bang		Read the chapter
Chapter 2:	Time and Space		Read the chapter
Chapter 3:	Matter and the Nebular Hypothesis		Read the chapter
Unit 2	The Solar System	Week 2	Starts May 11th, 2026 (33 pages)
	Unit 2 Introduction		Read the introduction
Chapter 4:	A Star Called the Sun		Read the chapter
Chapter 5:	Geometry of the Solar System		Read the chapter
			Complete Quiz 1
	Academic Integrity Quiz	Mandatory	Friday, May 15 @ 3:30 pm
Unit 3	The Terrestrial Planets	Week 3	Starts May 18th, 2026 (47 pages)
	Unit 3 Introduction		Read the introduction
Chapter 6:	When Two Planets Collide		Read the chapter
Chapter 7:	The Earth		Read the chapter
Chapter 8:	The Moon		Read the chapter
			Complete Quiz 2
	The Terrestrial Planets	Week 4	Starts May 25th, 2026 (47 pages)
Chapter 9:	Mercury		Read the chapter
Chapter 10:	Venus		Read the chapter

	Independent reading and study time		Complete Quiz 3
	The Terrestrial Planets	Week 5	Starts June 1st, 2026 (29 pages)
Chapter 11:	Mars		Read the chapter
			Complete Quiz 4
	ProctorTrack Onboarding	Mandatory	Monday, June 1 @ 3:30 pm
This is the end of the material that will be on the Mid-term			
Units 1-3	Revision for Mid-term	Week 6	Starts June 8th, 2026 (152 pages)
	Deadline for Quizzes 1, 2, 3, 4		Monday, June 8 @ 3:30 pm
	Review previous material in preparation for the Mid-term		
	Exam will be on-line, proctored, and synchronous	Mid-term Exam	Thursday, June 11, 2026 @ 1:30-3:30 pm EST (Tentative)
Unit 4	From Asteroids to Meteorites	Week 7	Starts June 15th, 2026 (33 pages)
	Unit 4 Introduction		Read the introduction
Chapter 12:	Asteroids		Read the chapter
Chapter 13:	Meteorites		Read the chapter
			Complete Quiz 5
Unit 5	The Gas Giants	Week 8	Starts June 22nd, 2026 (29 pages)
	Unit 5 Introduction		Read the introduction
Chapter 14:	Jupiter and Its Moons		Read the chapter
	The Gas Giants	Week 9	Starts June 29th, 2026 (38 pages)
Chapter 15:	Saturn and Its Moons		Read the chapter
Chapter 16:	Uranus and Neptune		Read the chapter
			Complete Quiz 6
Unit 6	Plutoids, TNOs, and Comets	Week 10	Starts July 6th, 2026 (33 pages)
	Unit 6 Introduction		Read the introduction
Chapter 17:	Plutoids and Trans-Neptunian Objects (TNOs)		Read the chapter
Chapter 18:	Comets		Read the chapter
			Complete Quiz 7
Unit 7	Extraterrestrial Life	Week 11	Starts July 13th, 2026 (29 pages)
	Unit 7 Introduction		Read the introduction
Chapter 19:	Life in the Universe		Read the chapter
			Complete Quiz 8

Units 4-7	Revision for the Final Exam	Week 12	Starts July 20th, 2026 (152 pages)
Review previous material in preparation for the Final Exam			
Have you completed the course and instructor evaluation survey?			
	Deadline for Forums participation:		
	Deadline for Quizzes 5, 6, 7, 8 submissions:		Wednesday, July 22 @ 3:30 pm
	The Final Exam is not cumulative and covers material from the Unit 4 Introduction through Chapter 19 (Unit 7)	Final Exam	TBD

5. Methods of Evaluation

The overall course grade will be calculated as listed below:

Midterm Exam	Final Exam	Quizzes	Forums
35%	35%	15%	15%

Description / Marking Scheme	Breakdown	Description	Deadline
Mid-term Exam	35%		
<ul style="list-style-type: none"> Exam will be on-line, closed-book, proctored, and synchronous (timed, 2 hours). This covers Units #1, 2 and 3 inclusive (to the end of Chapter 11) 			Thursday, June 11, 2026 @ 1:30-3:30 pm EST (Tentative)
Final Exam	35%		
<ul style="list-style-type: none"> Exam will be on-line, closed-book, proctored and synchronous (timed, 2 hours). This covers Units 4, 5, 6 and 7 (Chapters 12 to 19). The final exam is not cumulative. 		(Date and time to be determined by the Registrar's office)	
Graded Quizzes	15%		
<ul style="list-style-type: none"> There are 8 graded quizzes (numbered 1, 2, 3, 4, 5, 6, 7, 8). There are also 8 self-tests available as practice. These are not graded. 		You should try to complete the quizzes each week as you read the related chapters. Don't wait to submit your quizzes until the	Deadline for Quizzes #1, 2, 3, 4: Monday, June 8 @ 3:30 pm

<ul style="list-style-type: none"> Spelling and grammar count on the quizzes! Misspelled words will not be recognized. The quizzes are automatically administered through the OWL system. 		last minute! Last minute computer problems will not be accepted as grounds for accommodation.	Deadline for Quizzes #5, 6, 7, 8: Wednesday, July 22 @ 3:30 pm
<ul style="list-style-type: none"> Academic Integrity Quiz 	Mandatory		Friday, May 15 @ 3:30 pm
<ul style="list-style-type: none"> ProctorTrack Onboarding Quiz 	Mandatory		Monday, June 1 @ 3:30 pm
Participation in Forums	15%		
<ul style="list-style-type: none"> Participation in online forums and online polls throughout the OWL Brightspace Lessons pages is required. 		Please see “More about forums” below	

More about Forums:

You can access the forums on The OWL website via the "Content" tab (Content ▶ Course Notes ▶ Unit # ▶ Forums related to this unit) or the Communications tab (Communications ▶ Discussions). You should treat these assignments as a chance to discuss topics related to class material with your classmates. Feel free to ask each other questions, answer other people's questions, and make comments. All class participants are required to read and contribute to the forums.

As part of the learning process, I expect all students to participate actively online. There are 7 forums. You are expected to 1) contribute one post to each forum and 2) reply to two of your classmates' posts in each forum starting May 4th. Please make your posts engaging, thought-provoking, and relevant. Try to provide clear, concise, and correct explanations that help others gain a better understanding of concepts. There may also be polls scattered throughout the course notes – please complete the polls and see how your classmates responded. Remember that forums count for 15% of your grade.

Here are some guidelines we will use to evaluate your work:

- Do you make outstanding, original, and informative posts?
- Do you make attentive and constructive comments on other people's posts?
- Do you ask questions that are penetrating or help clarify?
- Do you contribute strategically (understanding that other students are in the class)?
- Do you actively encourage others to express their ideas?
- Do you use language that communicates interest in what others are saying?
- Do you complete forum posts on time?
- Do you interact constructively with the TAs and instructor?

You will not receive credit for posts and comments that are:

- Low effort (e.g. "Great idea", "Interesting", "I liked this chapter").

- A single line or overly terse.
- Disrespectful posts and comments.
- Irrelevant to the unit covered
- Plagiarized

Remember: the whole point is to engage with the course material, your classmates, and the instructor. You need to put in effort!

In the “Discussion page,” you will see forums for the Mid-term and Final Exam Q&A. I encourage you to post any questions you have to these forums, as your classmates might have the same questions and could help. If you have questions involving personal or academic matters, you can email the TA or instructor directly. But please consider posting your query to the forum, where you may get a quicker response and allow other students to benefit from the discussion. Be sure to check regularly for new forum posts.

Accommodations:

For **Mid-term**: Students who have an excused absence (accommodation from an academic counsellor with a note) will receive the following accommodations:

- A make-up midterm will be offered on Thursday, June 18th at 3:30 pm (tentative)
- If you have a legitimate reason for missing both the mid-term and the make-up midterm, you will receive an “incomplete” (INC) in the course and write the midterm the next time the course is offered. The final exam is not cumulative and will not be re-weighted. No exceptions.

For **Forums**:

- Posting: You have the entire term to post in the Forums, unless you have accommodation for the entire term, there will be no accommodation for students who fail to post before the deadline.
- Reading: If a student has a legitimate reason for not reading the forum posts by the end-of term deadline, their grade will be based on the percent read at an earlier date in the term (e.g., at the midterm date).

For **Quizzes**:

- The quizzes are automatically graded through the OWL system. Your two (2) lowest quizzes will be dropped from your final grade, so there will be no makeup quizzes. Do them early. Don't wait to submit your quizzes until the last minute! Last-minute computer problems will not be accepted as grounds for accommodation.

Course-specific conditions that are required to pass the course:

You must receive a **50%** overall to pass the course.

Use of Generative AI Tools

The use of generative AI tools (e.g., ChatGPT, Microsoft Copilot, Google Gemini, Anthropic Claude, or similar platforms) is **not permitted** in the completion of any course assessments, including but not limited to: assignments, quizzes, forums, presentations, tests, and final examinations.

General information about missed coursework

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs* posted on the Academic Calendar: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf,

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person.

The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult [Accessible Education](#).

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage: https://registrar.uwo.ca/academics/academic_considerations/

All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request **without supporting documentation** in this course. However, the following assessments are excluded from this, and therefore always require formal supporting documentation:

- Examinations scheduled during official examination periods (Defined by policy)
- Midterm (Designated by the instructor as the one assessment that always requires documentation when requesting Academic Consideration)

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. **All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.**

When a student *mistakenly* submits their one allowed Academic Consideration request **without supporting documentation** for the assessments listed above or those in the **Coursework with Assessment Flexibility** section below, the request cannot be recalled and reapplied. This privilege is forfeited.

When a student misses the Final Exam and their Academic Consideration has been granted, they will be allowed to write the Special Examination (the name given by the University to a makeup Final Exam). See the Academic Calendar for details (under [Special Examinations](#)), especially for those who miss multiple final exams within one examination period.

6. Additional Statements

6.1 Religious Accommodation

When a recognized religious holiday or observance conflicts with an examination, test, or other scheduled academic obligation, students must request accommodation via the University's Student

Absence Portal (SAP). This request should identify the conflict and specify which course component(s) (e.g. test, midterm, exam) are affected.

Students are encouraged to submit the SAP request as early as possible, but no later than two weeks before any examination, or one week before any mid-term test or quiz, to allow sufficient time for adjustment.

The SAP request serves as official notification to both the course instructor and the Academic Advising Office, in accordance with University policy:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

The Faculty of Science considers religious accommodations as scheduling conflicts. Instructors should provide either a make-up exam or an earlier sitting of the same exam to accommodate the student.

For more information on recognized religious holidays, please visit the Diversity Calendar posted on the Equity, Diversity & Inclusion website - <https://www.edi.uwo.ca>

6.2 Academic Accommodation Policies

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf.

6.3 General Academic Policies

The website for Registrar Services is <https://www.registrar.uwo.ca/>.

Use of @uwo.ca email: In accordance with policy, https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf, the centrally administered e-mail account provided to students will be considered the individual's official university email address. It is the responsibility of the account holder to ensure that emails received from the University at their official university address are attended to in a timely manner.

Requests for Relief (formally known as “appeals”)

Policy on Request for Relief from Academic Decision:

https://uwo.ca/univsec/pdf/academic_policies/appeals/requests_for_relief_from_academic_decisions.pdf

Procedures on Request for Relief from Academic Decision (Undergraduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/undergrad_requests_for_relief_procedure.pdf

For both mid-term and final exams, a single-sided hand-written crib sheet and a non-programmable calculator may be used.

6.4 Scholastic Offences

Policy on Scholastic Offences:

https://uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_offences.pdf

Procedures on Scholastic Offences (Undergraduate):

https://uwo.ca/univsec//pdf/academic_policies/appeals/undergrad_scholastic_offence_procedure.pdf

Use of Electronic Devices During Assessments

In courses offered by the Faculty of Science, the possession of unauthorized electronic devices during any in-person assessment (such as tests, midterms, and final examinations) is strictly prohibited. This includes, but is not limited to: mobile phones, smart watches, smart glasses, and wireless earbuds or headphones.

Unless explicitly stated otherwise in advance by the instructor, the presence of any such device at your desk, on your person, or within reach during an assessment will be treated as a *scholastic offence*, even if the device is not in use.

Only devices expressly permitted by the instructor (e.g., non-programmable calculators) may be brought into the assessment room. It is your responsibility to review and comply with these expectations.

Use of Generative AI Tools

Unless otherwise stated, the use of generative AI tools (e.g., ChatGPT, Microsoft Copilot, Google Gemini, or similar platforms) is **not permitted** in the completion of any course assessments, including but not limited to: assignments, lab reports, presentations, tests, and final examinations.

Using such tools for content generation, code writing, problem solving, translation, or summarization—when not explicitly allowed—will be treated as a **scholastic offence**.

If the use of generative AI is permitted for a particular assessment, the conditions of use will be specified by the instructor in advance. If no such permission is granted, students must assume that use is prohibited. It is your responsibility to seek clarification before using any AI tools in academic work.

6.5 Support Services

Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, requests for relief, exam conflicts, and many other academic-related matters: <https://www.uwo.ca/sci/counselling/>.

Students who are in emotional/mental distress should refer to Mental Health@Western (<https://uwo.ca/health/>) for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence (GBSV) and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced GBSV (either recently or in the past), you will find information about support services for survivors, including emergency contacts, at:

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

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. If you have any questions regarding accommodations, you may also wish to contact Accessible Education at

https://academicsupport.uwo.ca/accessible_education/index.html

Learning-skills counsellors at Learning Development and Success (<https://learning.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.

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