ENVIRONMENTAL SYSTEMS & SOCIETIES

An introduction to the IB ESS course

What ESS is • what you will study • how the course works • assessment • skills • academic integrity



Based on Oxford Environmental Systems and Societies Course Companion (2024), pp. 6–13

What is ESS?

A course about environmental science — and the human choices connected to it.

Environmental

ESS studies the natural environment: ecosystems, biodiversity, water, soils, the atmosphere, climate and natural resources. You learn the science needed to understand how environmental systems function and how they change.

Systems + Societies

ESS also studies people and societies: values, economics, politics, ethics, laws, resource use and decision-making. Environmental problems are therefore explored as both scientific and social issues.

The key idea: environmental issues cannot be understood from only one subject or one point of view.

Why is ESS interdisciplinary?

ESS connects knowledge from the sciences with ideas from the social sciences.

- It can meet IB requirements for Group 3, Group 4, or both.
- It is offered at Standard Level (SL) and Higher Level (HL).
- Scientific evidence is considered together with social, economic, political and ethical contexts.
- Different perspectives matter because people may interpret the same environmental issue differently.
- Sustainability is central: human demands on natural resources must be considered in relation to what the biosphere can provide.

SCIENCE ↔ SOCIETY ↔ DECISIONS ↔ ENVIRONMENT

What does ESS aim to develop?

The course is designed to help you understand, evaluate and act.

1. **Understand impact** — Recognize your own environmental impact within the much larger impact of humanity on Earth and the biosphere.
2. **Understand perspectives** — Build knowledge of different perspectives that can be used when addressing sustainability issues.
3. **Think critically** — Engage with environmental debates and evaluate tensions, evidence and competing arguments.
4. **Think in systems** — Use a systems approach to understand how different parts of an environmental issue are connected and how a change in one part can affect the others.
5. **Engage locally and globally** — Be prepared to participate in environmental issues and consider meaningful action in different contexts.

Environmental challenges — but also reasons for hope

The introduction deliberately begins with “the good news”.

Energy transition

The book notes rapid development of renewable energy, including major growth in the USA and China. Renewable energy sources are becoming cheaper, showing that technological and economic change can support lower-carbon systems.

International cooperation

Countries have created agreements dealing with issues such as water pollution, air quality and biodiversity. Environmental problems often cross borders, so cooperation matters.

Biodiversity action

The text highlights the 2022 UN Biodiversity Conference (COP15) and its framework to address biodiversity loss, restore ecosystems and protect Indigenous rights, including “30 by 30” protection goals.

ESS is not only about describing problems. It asks how societies can understand them, respond to them and shape the future.

Do I need prior knowledge?

No specific prior learning is required before starting ESS.

You will develop the knowledge and skills you need as you move through the course.

- You are not expected to arrive as an expert in biology, geography, economics or politics.
- The course gradually develops scientific understanding, data skills, practical skills and critical thinking.
- Your own experiences and local environment can become useful contexts for understanding wider concepts.

What will we study?

Topic 1 provides the foundation; Topics 2–8 apply the ideas across environmental themes.

1 Foundation

2 Ecology

3 Biodiversity & conservation

4 Water

5 Land

6 Atmosphere & climate change

7 Natural resources

8 Human populations & urban systems

Topic 1 should be studied first because it introduces three ideas that run through the whole course: perspectives, systems and sustainability.

The three foundation concepts

These ideas will keep returning, whatever environmental topic we study.

Perspectives

How people understand an environmental issue. Perspectives are influenced by assumptions, values, beliefs, culture, knowledge, experience and other social factors. Different perspectives can lead to different decisions.

Systems

A way of looking at connections, relationships, inputs, outputs, processes and feedback. Systems thinking helps us avoid treating environmental issues as isolated events.

Sustainability

A central concern of ESS: how people can meet needs and make choices while considering ecological limits, resource use and the ability of natural systems to continue functioning.

Higher Level: additional depth and three lenses

HL students study additional material across Topics 2–8.

AHL Sections marked Additional Higher Level are required for HL students only.

Environmental law

How legal rules, rights, responsibilities and institutions shape environmental decisions and environmental protection.

Environmental economics

How economic ideas, incentives, costs, benefits and resource choices help explain environmental decisions.

Environmental ethics

How moral values and ideas about what is right, fair or valuable influence environmental choices.

These lenses deepen understanding by bringing perspectives and concepts from other disciplines into ESS.

How is the course structured?

Topic 1 comes first because its three foundation concepts are used throughout Topics 2–8.

TOPIC 1 — FOUNDATION
Perspectives • Systems • Sustainability

These concepts are applied across the whole course

TOPIC 2
Ecology

TOPIC 3
Biodiversity & conservation

TOPIC 4
Water

TOPIC 5
Land

TOPIC 6
Atmosphere & climate change

TOPIC 7
Natural resources

TOPIC 8
Human populations & urban systems

SKILLS
practical work • data collection and analysis • investigation

ESS GUIDING QUESTIONS
connect ideas across topics

ENGAGEMENT
connect learning to real environmental issues

HL STUDENTS: additional HL content + three lenses — Environmental Law • Economics • Ethics

Key idea: Topic 1 provides the thinking tools; Topics 2–8 provide the environmental content.

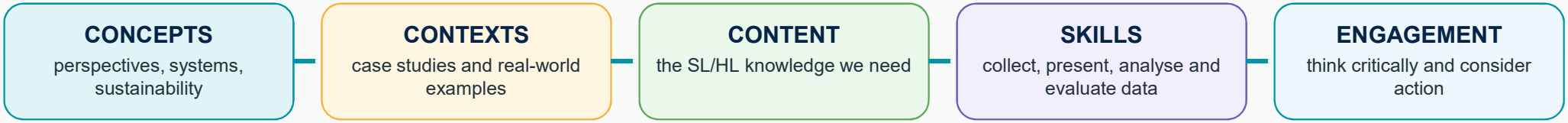
Concepts, contexts, content and engagement

In ESS, we use big ideas to understand real environmental situations.

How we learn in ESS

We do not simply memorise environmental facts. We use concepts to make sense of real problems and to evaluate different responses.

The same concept can be applied in different places, at different times and at different scales — local, national or global.



Example: Climate change

Concept: sustainability — can human societies meet their needs without damaging future generations?
Context: climate change in Greece, Europe or another region of the world
Content: causes, impacts, mitigation and adaptation
Skills: analyse temperature, emissions or energy data and evaluate reliability
Engagement: compare possible solutions and consider who is responsible for action

Student takeaway: ESS connects knowledge with judgement. You will be expected to explain, analyse, evaluate and justify your ideas using evidence.

How will you be assessed?

ESS uses both formative and summative assessment.

Formative assessment

Used during learning to check understanding and help the teacher decide what support or next steps are needed. Examples in the book include informal quizzes, class tests, preparation at home, practical-skill work, debates, reflective journals, feedback, observations, interviews, self-assessment and in-class activities.

Summative assessment

Used at the end of a unit or course to evaluate learning against standards or criteria. Examples include end-of-topic tests, end-of-term tests, IB examinations and the IB internal assessment investigation.

Formative = assessment for learning • **Summative = assessment of learning**

Practical work and applying skills

ESS is not only a theory course.

- Classroom activities: planning investigations, working with data, discussing evidence and evaluating environmental claims.
- Surveys and questionnaires: designing questions, collecting responses and interpreting patterns.
- Digital work: online simulations, data research and careful selection of information.
- Quantitative skills: using statistical tests and analysing experimental or field data.
- Laboratory experiments: generating evidence under controlled conditions.
- Fieldwork: investigating real ecosystems and environmental conditions outside the classroom.

Why local ecosystems matter

The book stresses that many parts of ESS are best understood by investigating ecosystems directly. Knowing one local ecosystem well can provide a useful context for many different concepts throughout the course.

Observe → collect evidence → analyse → explain → evaluate

The IB mission behind the course

ESS sits within the wider aims of the IB Diploma Programme.

The IB aims to develop inquiring, knowledgeable and caring young people who contribute to a better and more peaceful world through intercultural understanding and respect.

- IB programmes are designed to be challenging and internationally minded.
- Students are encouraged to become active, compassionate and lifelong learners.
- A key idea is learning to understand that people with different perspectives may also have valid reasons for their views.
- ESS supports these aims by asking students to examine evidence, values, perspectives and consequences.

The IB Learner Profile

Ten attributes describe the kind of learner the IB aims to develop.

Inquirers	curious, independent researchers
Knowledgeable	understand significant local and global issues
Thinkers	use critical and creative thinking
Communicators	express ideas and collaborate effectively
Principled	act with integrity, fairness and responsibility
Open-minded	consider and evaluate different perspectives
Caring	show empathy and seek positive impact
Risk-takers	approach unfamiliar situations with courage
Balanced	value intellectual, physical and emotional well-being
Reflective	consider strengths, limitations and learning

Academic integrity: your work must be genuinely yours

Using sources is expected. Hiding sources is not.

Original work

Assignments should use your own language and expression. Your ideas should be your own, while the ideas and evidence you take from others must be clearly acknowledged.

Acknowledge sources

When you quote, paraphrase or closely summarize a source, credit it. Footnotes/endnotes and a bibliography allow the reader to identify where information came from.

All media count

Websites, emails, photographs, maps, illustrations, computer programs, data, graphs and audiovisual material should be acknowledged when they are not your own work.

Academic integrity is part of doing good science: another person should be able to trace your evidence.

Malpractice: plagiarism and collusion

Assessment must represent your own achievement.

Plagiarism

Presenting another person’s ideas or work as if they were your own. Avoid it by acknowledging borrowed ideas, marking direct quotations clearly, and citing sources for non-original material.

Collusion

Helping another student gain an unfair advantage — for example, allowing your work to be copied or submitted by someone else. The text also warns against duplicating work across different assessment components.

Other unfair actions — such as unauthorized exam materials or misconduct — can also count as malpractice.

How to use the Course Companion

The book is designed around concepts, contexts and active learning.

Guiding questions

At the start of each chapter, guiding questions introduce the kinds of problems and ideas you should be thinking about while studying the material.

Understandings + key terms

Understandings state what you are expected to study. Key-term boxes define important vocabulary used to explain environmental systems and societies.

Connections + TOK

Connections link content to other parts of ESS. Theory of Knowledge features focus on critical thinking and on how knowledge about the world is produced and justified.

“Check your understanding” sections act as checkpoints after a subtopic.

Applying and analysing

The book repeatedly asks you to do something with the knowledge — not just remember it.

ATL activities	Apply ESS knowledge while developing Approaches to Learning skills such as thinking, research, communication, social and self-management skills.
Data-based questions	Practise presenting, processing and analysing data. The syllabus gives significant attention to mathematical analysis of data generated by investigations.
Case studies	Use real-world examples to examine context, stakeholders and environmental impacts.
Practical work	Carry out activities in the classroom, laboratory or field. Practical experience is an important part of the course.
Exam-style questions	At the end of themes, combine concepts from different parts of the course and practise the style of questions used in examinations.

Terminology you will see in the book

Some labels are chosen for consistency across an international course.

Country income groups

The book uses HIC, MIC and LIC for high-, middle- and lower-income countries. You may meet other labels elsewhere, but the course companion uses these income-based terms.

Soil classification

The book mainly uses USDA soil taxonomy, which contains 12 soil orders. Topic 5 includes terms such as mollisols, alfisols, gelisols and oxisols. Other systems, including FAO terminology, may use different names.

Important ESS habit: always check which definition or classification system is being used.

What should you expect in ESS lessons?

A course built around questions, evidence, discussion and investigation.

- Learn key scientific ideas and environmental vocabulary
- Use data, graphs, statistics and evidence
- Carry out practical work and fieldwork
- Compare different perspectives and values
- Discuss real environmental case studies
- Connect local examples to global issues
- Explain relationships using systems thinking
- Evaluate possible responses and their consequences
- Write clearly using evidence and correct terminology
- Reflect on your own assumptions and environmental impact

ESS asks: What is happening? Why? Who is affected? What can be done?

Your first ESS mindset

Three habits will help from the very beginning.

1. Ask for evidence

Do not accept a claim simply because it sounds convincing. Ask what evidence supports it, how the evidence was collected and what its limitations might be.

2. Look for connections

Environmental problems involve linked natural and human systems. Think about causes, effects, feedback, trade-offs and unintended consequences.

3. Consider perspectives

Different people and groups may hold different values and priorities. Understanding a perspective does not require agreeing with it — but it helps explain decisions.

Welcome to ESS — a course about understanding the Earth, understanding people, and understanding the connections between them.