

## Environmental systems and societies ESS



<http://qsindia.in/iso-14001-environmental-management-system-certi%EF%AC%81cation/>

### What is the course about?

ESS is an interdisciplinary group 3 and 4 course that is offered only at standard level (SL). It is designed to combine the methodology, techniques and knowledge associated with group 4 (sciences) with those associated with group 3 (individuals and societies).

It is a complex course, grounded in both a scientific exploration of environmental systems in their structure and function and in the exploration of cultural, economic, ethical, political, and social interactions of societies with the environment.

The students will learn how to recognize and evaluate the impact of our complex system of societies on the natural world. The interdisciplinary nature of the course requires a broad skill set from students and includes the ability to perform research and investigations and to participate in philosophical discussion. Students should be encouraged to develop solutions from a personal to a community and to a global scale.

The basis of the ESS course is the idea of environmental value systems (EVSs). Each individual, or group of individuals, will have his or her own EVS arising from his or her

beliefs and circumstances. Studying this course will lead students to critically examine and develop their own value systems. They should also become acquainted with the diverse range of EVSs of people from different cultures and backgrounds.

The main concepts of the course so called “the big questions” include sustainability, equilibrium, strategy, biodiversity and EVSs. “The big questions” provide a focus in a variety of ways as the course progresses and encourage a holistic perspective on the relationship between human societies and natural systems such as:

*A. Which strengths and weaknesses of the systems approach and of the use of models have been revealed through this topic?*

*B. To what extent have the solutions emerging from this topic been directed at preventing environmental impacts, limiting the extent of the environmental impacts or restoring systems in which environmental impacts have already occurred?*

*C. What value systems are at play in the causes and approaches to resolving the issues addressed in this topic?*

*D. How does your personal value system compare with the others you have encountered in the context of issues raised in this topic?*

*E. How are the issues addressed in this topic relevant to sustainability or sustainable development?*

*F. In which ways might the solutions explored in this topic alter your predictions for the state of human societies and the biosphere decades from now?*

### **Core topics of the course include the following:**

Topic 1— Foundations of environmental systems and societies

Topic 2—Ecosystems and ecology

Topic 3—Biodiversity and conservation

Topic 4—Water and aquatic food production systems and societies

Topic 5—Soil systems and terrestrial food production systems and societies

Topic 6—Atmospheric systems and societies

Topic 7—Climate change and energy production

Topic 8—Human systems and resource use

## How is the course examination structured?

### Key features of the curriculum and assessment models

- Available **only at standard level (SL)**
- The minimum prescribed number of **hours is 150**
- Students are assessed both externally and internally
- External assessment consists of two written papers.
- Internal assessment accounts for 20% of the final assessment and is comprised of a series of practical and fieldwork activities.

### Assessment objectives

Assessment component	Weighting (%)	Approximate weighting of objectives in each component (%)		Duration (hours)
		1 and 2	3	
Paper 1 (case study)	25	50	50	1
Paper 2 (short answers and structured essays)	50	50	50	2
Internal assessment (individual investigation)	25	Covers objectives 1, 2, 3 and 4		10

#### *Paper 1 – based on a case study*

- Students will be provided with a range of data in a variety of forms relating to a specific, previously unseen case study.
- Questions will be based on the analysis and evaluation of the data in the case study.
- All of the questions are compulsory.

#### *Paper 2 - Section A: answer questions; Section B: two essays from a choice of four*

- Paper 2 consists of two sections, A and B.
- Section A (25 marks) is made up of short-answer and data-based questions.
- Section B (40 marks) requires students to answer two structured essay questions from a choice of four. Each question is worth 20 marks.

### ***Internal assessment IA - Individual investigation***

Completion of an individual investigation of an ESS research question that has been designed and implemented by the student. The investigation is submitted as a written report.

- focus on a particular aspect of an ESS issue and apply the results to a broader environmental and/or societal context.
- The report should be 1,500 to 2,250 words long.

### **Practical activities**

Students of ESS are required to spend a minimum of **30 hours** on practical activities (excluding time spent writing up work), with 10 hours for the internal assessment investigation (IA). During the first year the students will participate in various field trips and collect their data for internal assessment.

### **How is the course assessed?**

Each topic will be ended with a revision test. Throughout the course students will be given handouts and exercises to revise and solidify what they learned. Additionally, there will be individual and group presentations on given topics. The first year of the course will be summarised by the end-year exam and during the second year the students will have to take mock exam from the course.

### **Are there any requirements?**

- Strong writing skills
- Good command of English
- Biology IGCSE grade C or higher

### **What materials will I need?**

All needed materials will be provided by the school and the course teacher

## What will I learn?

1. Acquire the **knowledge and understandings of environmental systems** at a variety of scales
2. Learn **how to apply the knowledge, methodologies and skills** to analyse environmental systems and issues at a variety of scales?
3. Appreciate the **dynamic interconnectedness between environmental systems and societies**
4. Value the combination of personal, local and global **perspectives in making informed decisions and taking responsible actions on environmental issues**
5. Be **critically aware that resources are finite**, and that these could be inequitably distributed and exploited, and that management of these inequities is the key to sustainability
6. Develop **awareness of the diversity of environmental value systems**
7. Develop critical awareness that **environmental problems are caused and solved by decisions made by individuals and societies** that are based on different areas of knowledge
8. **Create innovative solutions** to environmental issues by engaging actively in local and global contexts

## What from the course can make worthwhile extended essay EE questions?

EE in EES provides a candidate with the opportunity to explore questions in all environments and its subject will lie in the application of a systems approach to an environmental issue. EE focuses on the interaction and integration of environmental systems and human societies. A topic should be chosen that allows the student to demonstrate some grasp of how both environmental systems and societies function in the relationship under study. EE must be open to analytical argument. The topic must have a sharp focus than too broad, e.g.

“The ecological recovery of worked-out bauxite quarries in Jarrahdale, Western Australia” is better than “Environmental effects of mining”.

“A comparison of the energy efficiency of grain production in The Netherlands and Swaziland” is better than “Efficiency of world food production”.

· “The comparative significance of different sources of carbon dioxide pollution in New York and Sacramento” is better than “Impacts of global warming

## **Environmental systems and societies and creativity, activity and service CAS**

CAS enables students to embody the attributes of the IB learner profile in real and practical ways, to grow as unique individuals and to recognize their role in relation to others. The three strands of CAS are:

- creativity—exploring and extending ideas leading to an original or interpretive product or performance
- activity—physical exertion contributing to a healthy lifestyle
- service—collaborative and reciprocal engagement with the community in response to an authentic need.

There are strong links between ESS and CAS that both teachers and students can explore. In ESS students actively engage with environmental issues and create innovative solutions where possible.

Students could extend their classroom activities into CAS experiences using their learning in purposeful and meaningful ways. All three strands of CAS can be incorporated into experiences that relate to ESS within local, national and global communities.

## **Environmental systems and societies and theory of knowledge TOK**

The TOK course engages students in reflection on the nature of knowledge and on how we know what we claim to know.

TOK lessons can support students in their study of ESS, just as the study of ESS can support students in their TOK studies. TOK provides a space for students to engage in stimulating, wider discussions about questions such as what it means for a discipline to be a natural science or a human science, or whether there should be ethical constraints on the pursuit of this knowledge. It also provides an opportunity for students to reflect on the methodologies of ESS as an interdisciplinary subject, and how these compare to the methodologies of other

areas of knowledge. It is now widely accepted that researchers utilize not only scientific methods, but a variety of approaches, in order to enhance understanding of the interaction between environmental systems and societies.

Knowledge questions are open-ended questions about knowledge, and can include the following:

- How do we distinguish science from pseudoscience?
- How does a systems approach enhance our understanding of environmental issues?
- How does knowledge of environmental systems progress?
- What is the role of imagination and intuition in a systems approach?
- What are the similarities and differences in the methods of gaining knowledge in the natural sciences and in the human sciences?
- How does emotion impact on our perception and understanding of environmental issues?

### **Where can I find more information about the course?**

[https://ibpublishing.ibo.org/ess/apps/dpapp/toc.html?doc=d\\_4\\_ecoso\\_gui\\_1505\\_1\\_e](https://ibpublishing.ibo.org/ess/apps/dpapp/toc.html?doc=d_4_ecoso_gui_1505_1_e)

or ESS teacher Izabela Wierzbowska [i.wierzbowska@uj.edu.pl](mailto:i.wierzbowska@uj.edu.pl)