E-COURSE:

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| Institution | Khovd University of Mongolia |
| Course name | **Advances in the Natural science Index: TENA605** |
| Credits | 3ECTS |
| Course type | Specific course (Required course) |
| Lecturers | B.Bayarkhuu, D.Batstetseg |
| Level | MSc and PhD courses |
| Course duration | 16 weeks |
| Type | General skill |

Summary (main concept and understanding)

This course serves as natural science tendency and natural components research trends.

The course will provide Natural science concepts and scientific concepts are, natural components and its research methodology, natural resourcese research methodology, biological diversity research methodologies, water resources, land resources, to study the scientific basis of the usage of mineral resources and renewable energy sources for the supply of energy and electricity, global and local environmental issues its condition of the status.

Summary

Research methods in the fields of geography, chemistry, biology and ecology, research areas such as natural complexes, types and classifications of natural resources, issues of their use and protection, changes in them and their negative impacts will be studied. To study the main issues of natural complex, biodiversity research methodology, water resources, land resources, current status of pasture use, renewable energy research, rational use of minerals and minerals, and natural resource research, use and conservation science. In addition, it provides theoretical knowledge and skills on global and local issues in natural science.

Key word (8-12 words)

Trends of natural science, environmental sciences, natural resources, management, natural component combination, research achievement

Target audience

MSc and Ph.D. students in environmental science, geography, biology, chemistry studies.

Prerequisites

Required courses (or equivalents):

- Geography and Environmental Sciences

- landscape study

- Soil geography

-Organic chemistry

Aims and objectives

The training aims to understand the basic definition of natural science and environmental resources,

* To learn and understand the environment and natural resources and their understanding
* To learn and understand the natural study and its definition
* To learn and understand natural components research usage defining natural research achievement
* To learn and understand natural components combination its study
* To learn and understand Mongolian pasture land ecology and land management
* To understand the natural science trend mass approach

General learning outcomes:

End of this course, successful students will

- Understanding of natural and environmental sciences

- Natural science trend patterns

- Types and categories of natural resources, exhaustible and inexhaustible resources is study approaches

- Understanding of usage scientific appproch

- To understand the current situation of integrating combating desertification topic into environmental education curricula in Mongolia.

Applicable learning outcomes:

- Critically reflect the importance of ecology and natural science trend

- Can be carried out scientific approaches

- Be aware of research trend and previous researches knowledge

- Be aware of the natural components combination and research policy

- - Write a report, group discussion, conduct interview

- Be able to develop summaries for policy-makers

Overview of sessions and teaching methods

The course will be using interactive and self-reflective methods of teaching and learning and, where possible, avoiding standing lectures and presentations. It will open with an extended integrated introduction to natural science, environmental-related understanding, and environmental management. The first part of this course has given you knowledge of Trends in the development of natural sciences and research methods and theories. The study area has located in the local town in Mongolia. We will learn the natural science research pattern’s, natural components combination research achievement . The second part of the course will discuss a case study of chemistry, biology, physics, geography and ecology. More precisely, knowledge and research on natural study steps, basic concepts of social necessities, issues, and methods for solving the issues. As the third part of the lecture, the students will work in groups for exchanging. Finally, we will discuss an integrating topic into environmental education curricula in Mongolia. An ability to critically and creatively discuss key concepts, tools and methods has been presented in the literature. It will include the data collection, calculations, report writing, and make the presentation.

Course workload

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| --- | --- | --- | --- |
| Activities | Learning outcomes | Assessment | Workload (hours) |
| In-class activities | | | |
| Lectures | Understanding theories, concepts, methodology and tools. It includes Modern image of natural science development and its integration, trends in the development of natural sciences and research methods education for sustainable development. | Class participation | 30 |
| Moderated in-class discussions | Understand the nature based research factors for the case studies. Analyzing the current condition and carry out the solving ways. | Class participation and preparedness for discussions | 30 |
| In-class assignments | To understand the various policy and sceince contexts and problems in communication in research on combination of natural components | Class participation and preparedness for assignments | 30 |
| Independent work | | | |
| Paper review and discussion | Familiarity with an ability to critically and creatively discuss key concepts, tools, and methods as presented in the literature | Class participation creative and active contribution to discussion | 30 |
| Basic Concepts & Definitions | To understand basic concepts and their application, components. It will include the data collection, calculations, report writing, and make the presentation. | Group discussion and self-work Individual report and presentations | 30 |
| Total |  |  | 150 |

Grading

The performance of the student will be assessed on the basis of the following: common

- Preparedness level for involvement in class discussions and seminars - 30% (out of 100%);

- Input to group tasks and individual task presentation - 30% (out of 100%). From 100% for distinctly displayed inputs to 0% for non-participation);

- Performance in implementation in method and documenting and presentation – 30% (out of 100%). From 100% for a distinctly displayed report and presentation to 0% for non-participation):

~ Proper use of the approach + 10%

~ Report writing + 10%

~ Making presentation + 10%

Course schedule

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| --- | --- | --- | --- | --- |
| Class | Duration | Topic | Type | lecturer |
| 1 | 90 minutes | Modern image of natural science development and its integration | Lecture | B.Bayarkhuu  D.Battsetseg |
| 2 | 90 minutes | Trends in the development of natural sciences and research methods | Lecture | B.Bayarkhuu  D.Battsetseg |
| 3 | 90 minutes | Theories of geograpy | Lecture | B.Bayarkhuu  D.Battsetseg |
| 4 | 90 minutes | Natural components its combinations | Lecture Seminar | B.Bayarkhuu  D.Battsetseg |
| 5 | 90 minutes | Types and categories of natural resources. Depletable and non-depletable resources | Lecture | B.Bayarkhuu  D.Battsetseg |
| 6 | 90 minutes | Subsoil resources, use and protection Mineral resources, their use and protection | Lecture Seminar | B.Bayarkhuu  D.Battsetseg |
| 7 | 90 minutes | Air study | Lecture | B.Bayarkhuu  D.Battsetseg |
| 8 | 90 minutes | Water study | Lecture | B.Bayarkhuu  D.Battsetseg |
| 9 | 90 minutes | Soil study | Lecture | B.Bayarkhuu  D.Battsetseg |
| 10 | 90 minutes | Plant study | Group and self-work | B.Bayarkhuu |
| 11 | 90 minutes | Animal study | Lecture | B.Bayarkhuu  D.Battsetseg |
| 12 | 90 minutes | Pasture study | Lecture | B.Bayarkhuu |
| 13 | 90 minutes | Use and protection of agricultural land | Lecture | B.Bayarkhuu |
| 14 | 90 minutes | Renewable energy Solar and wind energy and use | Lecture Seminar | B.Bayarkhuu |
| 15 | 90 minutes | Global natural problems and solutions facing the world | Group and self-work | B.Bayarkhuu |
| 16 | 90 minutes | Mechanism of self-regulation of geosystems and its nature Nature's ability to regenerate itself | Presentation | B.Bayarkhuu |

Course assignments

Course assignment will constitute a multi-part project:

~Assignment #1 Introduction: 2 pages of review note in 1 Class

~Assignment #2 Basic concepts & definition: includes 2-4 classes

~Assignment #3 Surveys & Assessment: Includes 5-9 classes

~Assignment #4 Presenting: Full report 16 classes

Literature-compulsory

* S.I. Samygin. Concept of modern natural science. A textbook. - Rostov-na-Dony: "Phoenix", 2001. -576 p.
* PETRUCCI, Ralph H., et al.Ерөнхий хими. Америк хоорондын боловсролын сан, 1977 он.
* GÜNTHER, Harald.NMR спектроскопи: химийн үндсэн зарчим, ойлголт, хэрэглээ. John Wiley & Sons, 2013 он.
* Хүрээлэн буй орчны экологи, менежментийн асуудлууд Эмхт. Ж.Ариунжаргал, Н.Батсайхан, Д.Галбадрах - УБ 2003 – 254
* ENVIRONMENTAL MANAGEMENT /Sciemce and Engineering for Industry/. Iyyanki V Muralikrishna, Valli Manickam. BSPublications. India – 2017.
* ENVIRONMENTAL MANAGEMENT /A Core Text for O Level and IGCSE/. Second edition. John Pallister. OXPORD UNIVERSITY PRESS-80.
* В.С. Кирчанов, А.И. Цаплин Концепций современного естествознания <https://pstu.ru/files/file/FPMM/kse.pdf>
* Базаргүр Д., 1998. Бэлчээрийн мал аж ахуйн газар зүй. Улаанбаатар, 379 хууд.
* Даш Д., 2008. Газар ашиглалтын онол-аргазүйн асуудлууд. Улаанбаатар, 215 хууд.
* Literature-recommended
* OCKRIS, John O.’M.; РЕДДИ, Амуля К.Н. Орчин үеийн цахилгаан хими 2Б: Хими, инженер, биологи, хүрээлэн буй орчны шинжлэх ухааны электродик. Springer Science & Business Media, 2000 он.
* Clair N. MCCARTY, Перри Л.; PARKIN, Gene F. Химийн хүрээлэн буй орчны инженер ба шинжлэх ухаан.
* ЧАНГ, Рэймонд, Ерөнхий хими. Санамсаргүй байшин, 1986 он.
* [Байгаль орчны мэдээллийн сан (eic.mn)](https://eic.mn/)
* <https://www.natsci.upit.ro/>
* <https://journals.indexcopernicus.com/search/details?id=32196>