**SYLLABUS:**

**Environmental management**

Course name: Environmental management

Number of credits: 6 ECTS/3 MCTS

Period: Fall/Spring semester

| Host institution | National University of Mongolia, School of Engineering and Applied Sciences |
| --- | --- |
| Lecturer | Bat-Erdene Ariunsanaa |
| Level | PhD course |
| Course type | Major course |
| Course duration | 16 weeks |
| New/Revised | A newly developed |
| E-course link | <https://online.num.edu.mn/dashboard> |

### Summary

This 3 ECTS course encourages learners to:

* draw upon disciplines such as biology, Earth science, geography, economics and demographics
* consider the interdependence of the Earth’s natural systems and how people use natural resources
* examine the impact of development on the environment considering issues such as environmental pollution and resource depletion
* explore ways in which we may change the nature of future development to make it more sustainable.

Environmental Management is concerned not only with the impact of humans on the planet but also with the patterns of human behaviour necessary to preserve and manage the environment in a self-sustaining way. Study is linked to the areas of new thinking in environmental management, environmental economics and the quest for alternative technologies. Case studies allow candidates to obtain a local as well as a global perspective. Environmental Management recognises that human behaviour towards the environment is guided by the survival needs, perceptions and values of people. Underlying the syllabus there is a recognition that cultural, social and political attitudes directly influence the economy of nature. A core principle of the syllabus is that sustainability will only be achieved by changes in the ways in which people think and make decisions. A course in Environmental Management therefore calls upon learners to be participants in defining the future of their world.

### Target student audiences

Master or PhD students majoring in Environmental Science, Environmental Engineering

### Prerequisites

Required courses (or equivalents):

| 1. Environmental Study | ENVI200 |
| --- | --- |
| 1. Environmental Monitoring | ENVI301 |
| 1. Sustainable Development and green development policy | ENVI312 |

### Aims and objectives

The main course objective is to acquire:

* knowledge of natural systems which make life possible on Earth
* an understanding that humans are part of these systems and depend on them
* an appreciation of the diverse influences of human activity on natural systems
* an awareness of the need to manage natural systems
* an understanding of sustainable development to meet the needs of the present, without compromising the ability of future generations to meet their own needs
* a sense of responsibility and concern for the welfare of the environment and all organisms
* an awareness of their own values concerning environmental issues
* an awareness of the values of others
* a willingness to review their own attitudes in the light of new knowledge and experiences
* a sound basis for further study, personal development and participation in local and global environmental concerns.

**The authentic tasks**

At the end of each lecture, students will be asked key questions to reinforce their understanding of the topic covered in the lectures. Students will independently acquainted with the actual environmental management works implemented in Mongolia and other countries; and learn to plan solutions to environmental problems, to develop methods and tools of environmental management.

### General learning outcomes:

By the end of the course, successful students will:

| Knowledge | * phenomena, facts, definitions, concepts and theories * vocabulary, terminology and conventions * technological applications with their social, economic and environmental implications |
| --- | --- |
| Comprehensive | * Evaluate the direction and consequences of the impact of a particular type of economic activity on nature, linking the solution of production problems with compliance with relevant environmental requirements |
| Application | * Practical use of theoretical knowledge, conservation and planning tools |
| Analysis | * locate, select, organise and present information from a variety of sources * translate information and evidence from one form to another * manipulate numerical data • interpret and evaluate data, report trends and draw inferences. |
| Synthesis | * plan investigations * identify limitations of methods and suggest possible improvements * present reasoned explanations for phenomena, patterns and relationships * make reasoned judgements and reach conclusions based on qualitative and quantitative information. |

### Overview of sessions and teaching methods

The course will make most of interactive and self-reflective methods of teaching and learning and, where possible, avoid standing lectures and presentations. …

| Learning  methods | * Video presentations * Interviews, surveys, fieldtrip, group work, written articles/essay * Project Based Learning * Literature review * Stakeholder analysis/client consultancy |
| --- | --- |
| Course  outline | 1. Introduction to Environmental Management 2. Rocks and minerals and their exploitation 3. Energy and the environment 4. Agriculture and the environment-I 5. Agriculture and the environment-II 6. Water and its management-I 7. Water and its management-II 8. Oceans and fisheries 9. Managing natural hazards 10. The atmosphere and human activities 11. Human population and environment 12. Natural ecosystems and human activities 13. Environmental management for sustainability -I 14. Environmental management for sustainability –II 15. Environmental health –I 16. Environmental health -II |

### Course workload

The table below summarizes course workload distribution:

| Activities | Learning outcomes | Assessment | Workload  (hours) |
| --- | --- | --- | --- |
| **In-class activities** | | | | |
| Lectures | Understanding theories, concepts, methodology and tools | Class participation |  |
| Moderated in-class discussions | Understanding various policy and management contexts and common problems in communication in environmental governance | Class participation and preparedness for discussions |  |
| In-class assignments, field assignment | Understanding various policy and management contexts and common problems in communication in environmental governance | Class participation and preparedness for assignments |  |
| Reading and discussion of assigned papers for seminars and preparation for lectures | Familiarity with and ability to critically and creatively discuss key concepts, tools and methods as presented in the literature | Class participation, creative and active contribution to discussion |  |
| Group presentation | Ability to interpret data, to analyze audience, and to use the concepts, tools, and methods for communicating the EM | Quality of group assignments and individual presentations |  |
| **Independent work** | | | | |
| Group work:   * Contribution to the group case-study projects * Contribution to the preparation and delivery of individual presentation * Contribution to the web-application | Ability to interpret data, to analyze audience, and to use the concepts, tools, and methods for communicating information to all participants  Plan and develop a environmental management (EM), be aware of information visualization tools and methods | Quality of group assignments and individual presentations |  |
| Course group assignment | Ability to conceptualize and frame an environmental governance problem, find related literature and data, interpret data, use the concepts, tools and methods covered in the course, and draw policy/management relevant conclusions | Quality of developed EDP and their presentation |  |
| Group presentation | Ability to interpret data, to analyze audience, and to use the concepts, tools, and methods for communicating the EM | Quality of group assignments and individual presentations |  |
| **Total** |  |  |  |

### Grading

The students’ performance will be based on the following:

| Assessment | Progress assessment (40%):   * Attendance and academic activity (10%) * Progress test (30%)   Final assessment (60%):   * Information handling and analysis (30%) * Investigation skills and making judgements (30%) | | | | |
| --- | --- | --- | --- | --- | --- |
| Evaluation  EU system | A (8,5 – 10)  B (7,0 – 8,4)  C (5,5 - 6,9)  D (4,0 – 5,4) | Evaluation  MN system | 95-100  90-94  85-89  80-84  75-79  70-74  65-69  60-64  0-59 | A  A-  B  B-  C  C-  D  D-  F | 4.0  3.6  3.1  2.7  2.3  1.9  1.4  1.0  0.0 |

### Course schedule

| Week | In-class  hours | Topic | Type |
| --- | --- | --- | --- |
| 1 | 2 | * Introduction to Environmental Management | Lecture |
| 2 | * Environmental management projects implemented in Mongolia | Seminar |
| 2 | 2 | * Rocks and minerals and their exploitation: Formation of rocks; Extraction of rocks and minerals from the Earth; Impact of rock and mineral extraction; Managing the impact of rock and mineral extraction; Sustainable use of rocks and minerals; | Lecture |
| 2 | * Good and worse management case | Seminar |
| 3 | 2 | * Energy and the environment: Fossil fuel formation; Energy resources and the generation of electricity; Energy demand; Conservation and management of energy resources; Impact of oil pollution; Management of oil pollution; | Lecture |
| 2 | * Good and worse management case | Seminar |
| 4 | 2 | * Agriculture and the environment-I: Soil composition; Soils for plant growth; Agriculture types; Increasing agricultural yields; Impact of agriculture; Causes and impacts of soil erosion; Managing soil erosion; Sustainable agriculture; | Lecture |
| 2 | * Good and worse management case | Seminar |
| 5 | 2 | * Water and its management-I: Global water distribution; The water cycle; Water supply; Water usage; Water quality and availability; Multipurpose dam projects; Water pollution and its sources; Impact of water pollution; Managing pollution of fresh water; Managing water-related disease; | Lecture |
| 2 | * Good and worse management case | Seminar |
| 6 | 2 | * Oceans and fisheries: Oceans as a resource; World fisheries; Impact of exploitation of the oceans; Management of the harvesting of marine species; | Lecture |
| 2 | * Good and worse management case | Seminar |
| 7 | 2 | * Managing natural hazards: Earthquakes and volcanoes; Tropical cyclones; Flooding; Drought; The impacts of natural hazards; Managing the impacts of natural hazard; Opportunities presented by natural hazards; | Lecture |
| 2 | * Good and worse management case | Seminar |
| 8 | 2 | * The atmosphere and human activities: The atmosphere; Atmospheric pollution and its causes; Impact of atmospheric pollution; Managing atmospheric pollution; | Lecture |
| 2 | * Good and worse management case | Seminar |
| 9 | 2 | * Human population and environment: Human population distribution and density; Changes in population size; Population structure; Managing human population size; | Lecture |
| 2 | * Good and worse management case | Seminar |
| 10 | 2 | * Natural ecosystems and human activities: Ecosystems; Ecosystems under threat; Deforestation; Managing forests; Measuring and managing biodiversity; | Lecture |
| 2 | * Good and worse management case | Seminar |
| 11 | 2 | * Environmental management for sustainability: Environmental social impact assessment, its contribution to environmental management and sustainable development; Environmental management for sustainability -II: Environmental audit, its forms, contribution to environmental management and sustainable development | Lecture |
| 2 | * Good and worse management case | Seminar |
| 12 | 2 | * Environmental health: An introduction to the indoor environment, its hygiene and toxicology; Waste and hazardous waste management | Lecture |
| 2 | * Good and worse management case | Seminar |
| Lecture 32  Seminar 32 | | | |

### Course assignments/tests

Course assignments will constitute of questions, team work, reading, writing scientific paper reflection, presentation etc.,

### Literature

**Compulsory:**

1. ENVIRONMENTAL ECOLOGY AND MANAGEMENT ISSUES. Ariunjargal J. Batsaikhan N. Galbadrakh D. –Ulaanbaatar 2003 - 254.
2. Environmental and Health Risk Assessment and Management /Principles and Practices/. Paolo F. Ricci. Dordrecht, The Netherlands 2006-477
3. Environmental Management /Problems and Solutions/. R.Ryan Dupont, Terry E Baxter, Louis Theodore. CRC Press – 1998.
4. ENVIRONMENTAL MANAGEMENT /Sciemce and Engineering for Industry/. Iyyanki V Muralikrishna, Valli Manickam. BSPublications. India – 2017.
5. ENVIRONMENTAL MANAGEMENT /A Core Text for O Level and IGCSE/. Second edition. John Pallister. OXPORD UNIVERSITY PRESS-80.

**Recommended:**

1. Biological monitoring for detection of health effects of heavy metals in the workplace /Manual/. Ministry of Health. Ulaanbaatar city - 2014.
2. <http://www.freshwaterplatform.eu/> - The Network for freshwater research
3. [Байгаль орчны мэдээллийн сан (eic.mn)](https://eic.mn/) – The Environmental information center
4. Web Science articles