

Dear new environmental studies students,

Welcome to the department of Environmental Studies at the Open University of Tanzania. Approximately more than 80 students have enrolled into the degree programme during this academic year. Below is useful information that will assist you during the course of your study. Please take time to read this information very carefully. We hope that it will help to answer some of the many questions that you may have.

1. In this academic year the following courses will be offered:

(i) Bachelor of Science Environmental Studies (Science) stream

Course code	Course Title	Units	Course status
OEV 101	Ecology	2	Core
OEV 102	Computer Applications in Environmental Studies	2	Core
OEV 103	Introduction to Environmental Science	2	Core
OEV 104	General Chemistry	2	Core
OEV 105	Environmental Science Practicals I	1	Core
OEV 106	Mathematics for Environmental Studies	2	Core
OEV 107	General biology	2	Core
	Total	13	

(ii) Bachelor of Science Environmental Studies (Management) stream

Course Code	Course Title	Units	Course status
OEV 101	Ecology	2	Core
OEV 102	Computer Applications in Environmental Studies	2	Core
OEV 108	Introduction to Environmental Management	2	Core
OEV 109	Land Use and Planning	2	Core

OEV 110	Introduction to Environmental Pollution and Management	2	Core
OEV 111	Environmental Ethics and Philosophy	2	Core
	Total	12	Core

2. **OEV 105**, Environmental Science Practicals I will be carried out during practical period for all students in the faculty. The time and venue will be communicated to you later; but normally it will be around July-August, 2009 at SUA, UDSM or St. John University, Dodoma.

2. You are supposed to attempt **TWO** assignments for each course i.e. Assignment I and II respectively. Assignment I should be posted to the faculty before 12th December 2008, and assignment II before 27th March, 2009. All assignments are available in our website.

3. You are also supposed to sit for two tests, test one (around February, 2009) and test two (Around May/June, 2009) and final examination (around June/July, 2009). Test I and assignment I normally covers the **first half** of the syllabus while test II and assignment II covers the remaining **second half**. The final examination covers the **whole** syllabus materials. The date and venue for tests and examination will be communicated to you.

4. Two courses have been adopted from the existing courses in the faculty, OEV 101 (Ecology) is equivalent to **OBL 201**, Fundamentals of ecology and OEV 102 (Computer applications in Environmental Studies) is equivalent to **OCP 100**, Introductions to Microcomputer Studies and Information Technology.

5. It is our sincere hope that you have already completed proper registration and if that is the case, you will be given the study materials indicated in your registration form. Make sure that you possess the **right** study materials for the courses you have registered. We expect the study material to be available for you as follows;

Course code	Course Title	STATUS	DATE OF AVAILABILITY
OEV 101	Ecology (equivalent to OBL 201)	Available	NA
OEV 102	Computer Applications in Environmental Studies (equivalent to OCP 100)	Available	NA
OEV 103	Introduction to Environmental Science	On printing	Oct. 25, 2008.
OEV 104	General Chemistry	On printing	Oct. 25, 2008.
OEV 105	Environmental Science Practicals I	On printing	Oct. 25, 2008.
OEV 106	Mathematics for Environmental Studies	On printing	Oct. 25, 2008.
OEV 107	General biology	On typing	Nov.05,2008
OEV 108	Introduction to Environmental Management	On printing	Oct. 25, 2008.
OEV 109	Land Use and Planning	On printing	Oct. 25, 2008.
OEV 110	Introduction to Environmental Pollution and Management	On typing	Nov.05,2008
OEV 111	Environmental Ethics and Philosophy	On typing	Nov.05,2008

6. MODULE SPECIFICATION (COURSE OUTLINE) please read the following information about the syllabus content for each course.

OEV 101: Ecology
Number of Units: 2
Pre-requisite None

Course Rationale

The aim of the course is to familiarize students on how individual species interact and adapt to variations in their environment. Levels of interaction between living organisms. Study of population, community and ecosystem. The importance of ecology in environmental management.

Learning Outcomes

After completion of the course, students are expected to be able to:

- Identify major concepts in ecology,
- Describe how environmental factors determine species distribution,
- Describe how random genetic variation and natural selection lead to evolution, adaptation, niche specialization and partitioning of resource in biological communities,
- Describe population, community and ecosystem level ecology,
- Discuss the concept of biodiversity, restoration ecology and ecosystem management.

Course Description

Introduction to ecological principles. Factors that influence the distribution and abundance of organisms both, biotic and abiotic elements of the environment. Study of population, community, and ecosystem levels of ecology. Biomes. Introduction to biodiversity. Restoration and remediation ecology

Methods of Assessment

Continuous Assessment

Written assignments	15%
Timed tests	25%
Final examination	60%

Indicative Reading List

- (i) William, P. C. and Barbara, W (2000). *Environmental Science*. McGraw-Hill Companies, Inc.
- (ii) Jeffers, R (1978). *An Introduction to System analysis with Ecological application*. E. Arnold. London.
- (iii) Premjit, S (2007). *Applied Soil Ecology*. Gene-Tech Books, New Delhi.
- (iv) Mukul, K. Mitra, P.S. and Sreejata B.K. (2006). *Environmental Change and Its Impact. Classique*, New Delhi.
- (v) Mallapureddi, V.R (2006). *Restoration and Management of Tropical Eutrophic Lakes*. Oxford, New Delhi.
- (vi) Odum, E (2000) *Fundamentals of Ecology*. Sanders publisher

OEV 102: Computer Applications in Environmental Studies

Number of Units: 2

Pre-requisite: None

Course Rationale

Since students will have different backgrounds, there is need to bring them to the same level as far as information and communication technology is concerned. This course is designed to provide students with an introduction to computer applications including basic computer concepts and terminology, Hands-on experience in using operating system, word processing, spreadsheets, database management, and telecommunications.

Learning outcomes

On completion of the course students will be able to:

- Clearly identify the components of the information systems,
- Use standard packages in their daily activities,
- Identify different types of information systems,
- Analyse a system and produce relevant documentation,
- Demonstrate an understanding of present hardware, software, and related information technology concepts.

Mode of Assessment

Continuous Assessment

Written assignments	15%
Timed tests	25%

Final examination	60%
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Course Description

Computer history, hardware (computer system, peripherals and accessories). Software (operating systems, application packages, programming languages, Viruses, worms, Trojan horses, ant-viruses etc). Data and information, files and database, networks and communications technologies. Intranet, extranet, and the Internet, web browsing and e-mails applications. Information storage and handling (media and capacity), information systems in organizations, information technology at a national level. Social and organizational aspects of information systems.

Indicative reading list

- (i) Ralph, S. and George, R. (2005). Fundamentals of Information Systems
Publisher: Course Technology; 3rd Edition, Third Edition
- (ii) Robert, C. N. (2000). Business and Information systems, 2nd Edition.
Publisher Prentice Hall.

OEV 103: Introduction to Environmental Science

Number of Units: 2

Pre-requisite: None

Course Rationale

The course is designed to provide students with a background in environmental science and an awareness of environmental issues. The students will study the different physical, chemical and biological processes which generate the Earth's environment and which support life as we know it and also study various aspects of the exploitation, utilization and management of the environment and its resources, in the context of environmentally sustainable development.

Learning Outcomes

On completion of this course, students should be able to:

- Recognize a broad-based understanding of the complex nature of environmental science issues through the interdependent of physical, chemical and biological processes,
- Recognize threats to environmental sustainability, and contemplate possible alternatives,
- Explain some of the ways in which humans have modified natural environmental processes and evaluate a range of techniques by which the human impact on the environment (specifically that of environmental degradation) can be assessed and managed.

Course Description

An exploration of the evolution of the Earth's environment and of the progressive exploitation of environmental resources by humankind, an introduction to the rich diversity of life on Earth: its composition, evolution and interrelationships, an understanding of environmental drivers on industrial development, and of environmentally sustainable development options for industry, the evolution of human-environment relationships, of contemporary pressures and opportunities.

Mode of Assessment

Continuous Assessment

Written assignments	15%
Timed tests	25%

Final examination

60%

Indicative Reading List

- (i) Jackson, A. R.W. and Jackson, J.M. (2000). *Environmental Science: The Natural Environment and Human Impact*, second Edition, Pearson Education Limited, London.
- (ii) Enger, E.G. and Smith, B.F. (2000). *Environmental Science*. 7th Editions. McGraw Hill Publishers, Boston.
- (iii) Botkin, D.D., Keller, A.E. (2000). *Environmental Science: Earth as living planet*. John Wiley & sons Publishers, London
- (iv) Scott, J.T. (2003). *Environmental Research and Development*. Edward Elgar publishing Limited.

OEV 104: General Chemistry

Number of Units: 2

Pre-requisite: None

Course Rationale

This course is designed to introduce the basic concepts of inorganic, organic and physical chemistry upon which understanding of modern chemistry depends. These include ideas of atomic structure and covalent bonding, the concept of reaction mechanism in the context of key reactions of organic and inorganic chemistry, and the principles governing chemical processes in terms of thermodynamic properties and ideal models.

Learning outcomes

After studying this unit, students should be able to:

- Account for deviations of the behaviour of real systems from an ideal model,
- State and familiarize in general terms the three laws of thermodynamics,
- Account for the main types of intermolecular forces found in liquids and solutions,
- Define the relationship between Gibbs free energy and chemical equilibrium,
- Recognise, exemplify, systematically name, and diagrammatically represent the common functional groups of organic chemistry,
- Predict chemical reactions from knowledge of functional groups ,
- Apply kinetic data to predict reaction rates,
- Apply Hess' Law of heat summation,
- Name the four quantum numbers and their allowed values,
- Derive the shapes of molecules using the VSEPR method.

Course Description

Physical: Introduction to the content, methods and paradigms of physical chemistry, Chemical thermodynamics: change in internal energy, enthalpy and entropy. Ideal and non-ideal gases, Ideal and non-ideal gases and solutions. Henry's law; Raoult's law. Intermolecular forces in liquids and gases. Chemical kinetics. Thermochemistry .

Organic: Introduction and overview. Homologous series: alkanes, alkenes and alkynes, include physical and chemical properties. Nomenclature of Hydrocarbons. Organic functional groups. Acids and bases; Elimination. Additions to alkenes. Inorganic: Elements and compounds; Stoichiometry. Atomic structure, the Periodic table, ionic and covalent models of bonding; Lewis structures, resonance, shapes of molecules, VSEPR model; moles and molarity, pH control of solution reactions.

Mode of Assessment

Continuous Assessment

Written assignments	15%
Timed tests	25%
Final examination	60%

Indicative Reading List

- (i) Brown, T. and Leamay, H. (2001). *Chemistry: The Central Science*. Pentice-Hall, Inc. New Jersey.
- (ii) Petrucia, R. Harwood, G.H. and Herring G. (2005). *General Chemistry: 7th Edition*. Mcmillan Publishing Company, New York.
- (iii) Raph, S. B. and Wayne, E W. (1980). *General chemistry*. 2nd edition Houghton Miffling Company, USA.

OEV 105: Environmental Science Practicals I

Number of Units: 1

Pre-requisite: None

Course Rationale

This course aims to provide students with an opportunity to learn and apply a range of environmental laboratory techniques for the purpose of expanding research capabilities. The course is intended to expose students to the importance and significance of sample collection, storage and analysis. It emphasizes application of theoretical knowledge in a practical laboratory setting and develops record keeping and report writing skills.

Learning Outcomes

At the end of this course students should be able to:

- Acquire knowledge and critical understanding of concepts and principles of many specialist techniques for modern laboratory science practices,
- Develop problem solving skills in the laboratory environment,
- Familiarize with methods for sampling solutions, their storage and treatment,
- Carry out laboratory and field-oriented practical

Course Description

Determination of Acidity and alkalinity of water. Ethylenediaminetetraacetic acid (EDTA) titration of Ca^{2+} and Mg^{2+} (Total hardness) in natural waters. Determination of nitrate, phosphate, conductivity, turbidity in water. Estimation of dissolved oxygen (DO), estimation of biochemical oxygen demand (BOD), quantitative estimation of phytoplankton, quantitative estimation of zooplankton, estimation of total and faecal coliforms.

Mode of Assessment

Assessment of the course will base upon the regulation governing practical courses of the faculty of Science, Technology and Environmental Studies.

Indicative Reading List:

- (i) Williams, I (2001). *The Essential Guide to Environmental Chemistry*, Wiley.
- (ii) Spiro, W. M. & Stigliani, T. (1996). *Chemistry of the Environme.*, T. Prentice-Hall
- (iii) Connelly, W. (1997). *Basic Concepts of Environmental Chemistry*, Lewis 1997.
- (iv) Hemond A. & Fechner, S. (1994). *Chemical Fate and Transport in the Environment*, Academic Press.
- (v) Fellenberg, G. (2000). *The Chemistry of Pollution*, Wiley,
- (vi) Madigan, T. Martinko J.M & Parker J. B. (2003). *Biology of Microorganisms*. 10th Edition. Prentice-Hall International Inc.

OEV 106: Mathematics for Environmental Studies

Number of Units: 2

Pre-requisite: None

Course Rationale

This module aims to provide a foundation in Mathematics for students who intend to follow a degree programme in the area of Science or related disciplines.

Learning Outcomes

At the end of this course the students should be:

- Familiar with all standard mathematical notation,
- Able to demonstrate the understanding of general mathematical principles,
- Able to apply mathematical methods to solve simple problems requiring the use of algebraic and trigonometric formulae,
- Able to understand the basic principles of the calculus,
- Able to recognise when particular techniques are to be used in a variety of problems,
- Able to appreciate the importance of mathematics in almost any area of society.

Course Description

Familiarity with the terms: natural number, integer, rational number, irrational number, real number, fractions, modulus. Algebra: Laws of indices. Solution of quadratic equations by factors, using the formula or by completing the square. Solution of simultaneous equations, including by using matrices. Solution of linear and quadratic inequalities. Manipulation of polynomials, including: rearranging equations, brackets and factorisation. Sequences and series. Σ notation. Arithmetic progression. Geometric progression. Binomial expansions for any rational n . Function notation: $y = f(x)$. The equation of a straight line. Gradient and mid-point of the line joining two given points. Distance between two points. Parallel lines. Perpendicular lines. Finding the points of intersection of two curves. Two-dimensional trigonometry. Sine, cosine and tangent functions for any angle. Graphs of sin, cos and tan functions. The modulus function. Solving trigonometric equations for any angle in a given interval. Measurement in degrees and radians. Exponential growth and decay. Laws of logarithms. Differentiation. Notations dy/dx and $f'(x)$, $\sin x$, $\cos x$, $\tan x$, $\ln x$. Integration as the reverse process of differentiation. Introduction to numerical methods for solving roots of functions

Mode of Assessment

Continuous Assessment

Written assignments	15%
Timed tests	25%
Final examination	60%

Indicative Reading List

- (i) Kolman, B. (1984). *Introductory Linear Algebra with Applications 4th ed.*; MacMillan Publishing Co. NY,
- (ii) Cohn P.M. (1982). *Algebra I* (2nd edition), 1982, Wiley,
- (iii) Cohn P.M. (1994) *Elements of Linear Algebra*, Chapman & Hall.
- (iv) Sala, S.L. and Hille, E. (1995). *Calculus*, Wiley,
- (v) Spivak, M. (1998). *Calculus*, Addison Wesley,
- (vi) Rudin, W. (1976). *Principles of Mathematical Analysis*, McGraw-Hill,

OEV 107: General Biology

Number of units: 2 Units

Pre-requisite: None

Course Rationale

Since students enrolled in science stream of the environmental studies may have different backgrounds, there is need to provide sufficient knowledge in modern biology to better understand environmental studies. This course is designed to provide students with basic background information on major groups of living things including plant kingdom and animal kingdom. Also the course will provide an introduction to microbiology.

Learning outcomes

On completion of the course students will be able to:

- Describe the origin and nature of life,
- Clearly explain the distinctive features between plants and animals,
- Apply diversity and unity knowledge in living world to study forms and organization of the different organisms,
- Identify major groups of microorganisms and their economic importance.

Course Description

Introduction: origin and nature of life from simplest single-celled forms to complex plants and animals.

Plants and animal classification. Basic principles of plant and animal biology: cell biology, elements of biochemistry, nutrition, respiration, growth, genetics, evolution and ecology. In general the emphasis will be on the classification, structure, function, biological organization, growth, development, interaction and interdependence of organisms. Basic biology of bacteria, viruses and fungi.

Mode of Assessment

Continuous Assessment

Written assignments	15%
Timed tests	25%
Final examination	60%

Indicative Reading List

- (i) Preece, E.J and Read, E.P (2005). *The Biology of Horticulture*. John Wiley & Sons Inc.
- (ii) Robert, Brooker (2005). *Students Guide to Biology*. McGraw-Hill Companies, Boston
- (iii) Fleiser, A K (1992). *Introductory Experiments in Cell Biology*. Hunter Textbooks.

OEV 108: Introduction to Environmental Management

Number of units 2 units

Pre-requisite: None

Course Rationale

The course aims to provide an introduction to environmental management and to link both environmental and management aspects to the real environment. Notably, this course will integrate the managerial focus with the conceptual framework of both Environmental Impact Assessment and sustainable production system.

Learning Outcomes

At the end of this module students will be expected to be able to:

- Identify environmental media that need to be managed (land, water, biota),
- Describe the management systems that have been developed to improve our environmental management,
- Assess management systems use in conservation and protection of the environment and its resources
- Acquire information management and retrieval skills in using resources

Course Description

Introduction: Management and Environment; The Environment; Introduction to ecology-land, water, air, biota. A brief history of environmental (mis)management. The National Environmental Policy; Legislative background; Health and Safety aspects. Introductory aspects on business and environment i.e. Corporate Social Responsibility (CSR). Cleaner Production. Life Cycle Assessment. Environmental Management System-ISO 14001 (EMS). Environmental Audits. Environmental Monitoring. Interpretation of environmental data, Costs and benefits-case studies.

Mode of Assessment

Continuous Assessment

Written assignments	15%
Timed tests	25%
Final examinations	60%

Indicative Reading List

- (i) National Environmental Policy (1997).
- (ii) Environmental Management Act-2004.
- (iii) Blunden, J. and Reddish, A. (1996). *Energy, Resources and Environment*, Hodder & Stoughton.

- (iv) British Standards Institution, 1996, Implementation of ISO 14001: 1996. *An Environmental Management System- Specifications with guidance for use*’, BSI.
- (v) Gilpin, A. (1995). *Environmental Impact Assessment (EIA)*. Cambridge University Press.
- (vi) O’Riordan, Timothy, S. (2000). *Environmental Science for Environmental Management*. Harlow, Prentice Hall 2nd Edition.
- (vii) Porteous, A. (2000). *Dictionary of Environment Science and Technology*. Chichester, John Wiley and Sons Paperback, 3rd Edition.

OEV 109: Land Use and Planning

Number of units: 2

Pre-requisite: None

Course Rationale

This course introduces students to the concepts and procedures of land use planning and endeavors to raise awareness on how land can be utilized sustainably in the context of natural resources management and environmental conservation. The course therefore deals with aspects of land use, planning and management of natural resources and concentrates on management strategies and option for conservation.

Learning Outcomes

At the end of the course students should be able to:

- Define key concepts: Land, Land Use and Planning
- Describe methods used in assessment of land suitability
- Acquire skills on land use and planning
- Appreciate and predict the likely consequences of different land development.

Course Description

Definitions of concepts: Land, land resources, Land use Planning; Importance of land use planning, Land use planning and physical planning. Rural and urban land use planning. Land tenure, land rights and land markets, Qualities and limitations of land for different uses. Sustainability indicators. Social, economic and political tools for decision making on land use. Implementation of the agreed land resources development plan, Land use, planning and environmental impact assessment.

Mode of Assessment

Continuous Assessment

Written assignments **15%**

Timed tests	25%
Final examination	60%

Indicative Reading List

- (i) Anderson, B. (1967). *Potential Land Use Map, in Atlas of Tanzania* 4th Edition. Gov't printers Dar es Salaam.
- (ii) Beek, K. J. (1978). *Land Evaluation for Agricultural Development*, International Institute for Land Reclamation and Environment. Netherlands Publication N. 23.
- (iii) Dent D. and Young A. (1981). *Soil Survey and Land Evaluation*. George Allen and Unwin Ltd.
- (iv) Dixon J. A. and Sherman P.B. (1990). *Economics of Protected Area: A New Look at Benefits and Costs*. Earthscan Publications London.
- (v) Mitchell, B. (1989). *Geography and Resource Analysis*, 2nd Edition: Longman, London.
- (vi) Omara – Ojungu P.H. (1992). *Resource Management in Developing Countries –* Longman. *Essex*.

OEV 110: Introduction to Environmental Pollution and Management

Number of Units: 2

Pre-requisite: None

Course Rationale

The course introduces the students to the subject of environmental pollution with emphasis to (i) different types of pollutants and their sources (ii) various ways to mitigate the pollution (iii) the difference between pollution control and prevention

Learning Outcomes

On completion of the module the student should be able to:

- Identify the Sources of air, water and soil pollution and their environmental impact,
- Identify appropriate approaches to pollution control.

Course description

Different types of pollutants and their sources. Soil, water and air pollution. Techniques for remediation and restoration of polluted environment.

Mode of Assessment

Continuous Assessment

Written assignments	15%
Timed tests	25%
Final examination	60%

Indicative Reading list

- (i) Jackson, A.R. and Jackson, J.M. (2000). *Environmental Science: the Natural Environment and Human Impact*, 2nd edn, Pearson Education Limited, London.
- (ii) Peirce, J.J., Weiner, R.F. and Vessilind P.A (1990). *Environmental Pollution and Control*, 4th Edtn, Butterworth-Heinemann, Boston.
- (iii) Jorgensen, S.A. (1994). *Principles of pollution abatement*. Elsevier science, Amsterdam.

OEV 111: Environmental Ethics and Philosophy

Number of Units: 2 Units

Pre-requisite: None

Course Rationale

This course is designed to provide fundamental principles in environmental philosophy and ethics, understanding of environmental justice, major traditions in western ethical thought and non-western perspectives on environmental ethics.

Learning Outcomes

After completion of the course, students are expected to be able to:

- Explain the relationship between environmental management and ethical behaviour of individuals and society at a country,
- Describe principles of environmental ethics and philosophy,
- Compare and contrast how different ethical perspectives shape our environmental behaviour,
- Explain biocentrism, ecocentrism, egocentrism and ecofeminism, and what each says about human/nature relationships,
- Summarize the methods, application and limitations of the scientific methods,
- Demonstrate an understanding of the role of technology in causing environmental problems as well as help us solve them.

Course Description

Ethics: environmental racism, environmental equity, environmental justice dumping across borders, fragility and resilience of nature. Major traditions in western ethical thought: Judeo-Christian environmental ethics, the teleological tradition, utilitarianism, duties and rights, John Lock and property rights. Environmental ethics and environmental

philosophies, biocentric ethics, ecocentric ethics, animal rights, egocentrism, deep ecology, social ecology, ecofeminism. Non- western perspectives on Environmental ethics: ethics. Scientific methods application and limitation

Mode of Assessment

Continuous Assessment

Written assignments	15%
Timed tests	25%
Final examination	60%

Indicative Reading List

- (i) Dupont, R. R. Baxtert, E. and Theodore,L. (1998). *Environmental management: Problems and Solutions*. Lewis Publishers, London.
- (ii) Enger, E.G. and Smith B.F. (2000). *Environmental Science: A study of Interrelationship*, 7th edtn. McGraw-Hill Companies, Boston.

7. In case of difficulties don't hesitate to contact the following;

(i) Prof. S. Mbogo shaban.mbogo@out.ac.tz or smbogo@yahoo.com

(ii) Mr. L. Yohana lawi.yohana@out.ac.tz or ylawi@yahoo.com

The department wishes all of you successes studies at the Open University of Tanzania.