Semester:	3		
Course Code:	ENCM 21703		
Course Name:	Terrestrial and Aquatic Ecology		
Credit Value:	3		
Status:	Compulsory		
Pre-requisites:	None		
Co-requisites:	ENCM 21711		
Hourly Breakdown:	Theory	Practical	Independent Learning
	45	-	105

Intended Learning Outcomes:

After completion of this course unit, the student will be able to;

1. describe the structure and functioning of terrestrial and aquatic ecosystems,
2. explain the formation and characteristics of soil,
3. explain the characteristics of an ecological community,
4. discuss the impacts of dominant, keystone and foundation species on community structure,
5. calculate and interpret diversity indices and assess the variability of ecological communities,
6. explain the characteristics of populations including growth patterns, life history strategies and regulation of population size,
7. explain the global wind patterns, climatic zones and their relationship with the distribution of terrestrial biomes,
8. discuss the ecological concepts in relation to the functioning of aquatic ecosystems,
9. explain the ecological theories related to communities and populations in aquatic ecosystems, and
10. discuss the natural and anthropogenic impacts on terrestrial and aquatic ecosystems.

Course Content:

Terrestrial Ecology

Brief history of ecology and introduction to terrestrial ecology. Overview of structure and functioning of an ecosystem. Formation of soil and properties of soil as a microhabitat. Energy flow and productivity. Trophic structure and limits on food chain length. Bottom-up and top-down control of food chains. Carbon inputs, decomposition and carbon budget in an ecosystem. Biogeochemical cycling and retention. Characteristics of a community. Analysis of community structure using diversity indices. Habitat, niche and multidimensional niche theory. Impact of dominant, keystone and foundation species on the community structure. Characteristics of a population. Mechanisms of density independent and density dependent population regulation. Population growth patterns: exponential, geometric, and logistic growth. Life tables and survivorship curves. Population life history strategies including r-selection and K-selection.

Global wind cells, wind patterns and climatic zones. Classification of global climate: Heat zone classification, Köppen classification, and Thornthwaite classification. Factors affecting climate. Climate change: evidences, greenhouse effect, ozone depletion, global warming. Relationship between global climatic zones and major terrestrial biomes. Natural and anthropogenic impacts on terrestrial ecosystems.

Aquatic Ecology:

Lentic freshwater ecosystems: Origins & morphometry, physical and chemical water quality parameters, structure and functioning of lakes and other lentic water bodies, habitats in lentic systems, classification of biota; plankton, nekton, and benthos, trophic dynamics and energy flow. Lotic freshwater ecosystems: River continuum concept (RCC), Flood pulse concept, Serial discontinuity concept, physical structure and water flow, classification of lotic ecosystems, water quality and biological communities in streams and rivers, habitats and organisms, ecosystem processes and trophic dynamics, aquatic environmental monitoring and measures.

Brackish water ecosystems: Classification and importance of estuaries, lagoons and bays; tide and waves, water quality, biological communities, habitats and organisms, ecosystem processes and trophic dynamics, mangroves ecosystems, salt marshes, nutrient dynamics, brackish water productivity, impacts of anthropogenic activities.

Marine /coastal ecosystems: zonation of the sea, physicochemical parameters, marine productivity, water mixing in the sea; currents, surface and deep-water currents, upwellings, thermal vents. Marine communities; coral reefs, inter tidal habitats, deep sea organisms, sea grass beds and kelp forests.

Teaching /Learning Methods:

A combination of lectures, computer based learning, self-studies, small group discussions. Student presentations.

Assessment Strategy:

Continuous assessment and end of semester examination. Percentage given for each sub-component indicates the percent contribution to the final marks

Continuous Assessment 20 %	Final Assessment 80 %		
Details: Tutorial assignments 10 Group Presentations 10	Theory 80	Practical -	Other -

Recommended Readings:

1. Dobson, M. & C. Frid (2009). Ecology of Aquatic Systems. 2nd edition, Oxford: Oxford University Press.
2. Brönmark, C. & L. A. Hansson (2005). The Biology of Lakes and Ponds. Oxford University Press.
3. Day, J. W., W. M. Kemp, A. Yanez-Arancibia & B. C. Crump (2012). Estuarine Ecology, 2nd Edition, Wiley-Blackwell.
4. Tait, R.V. & F. A. Dipper (2000). Elements of Marine Ecology. Butterworth-Heinemann, Oxford.
5. Agren, G. I. & F. O. Anderson (2012).Terrestrial Ecosystem Ecology Principles and Applications. Cambridge University Press.
6. Chapin III, F. S., P. A. Matson & M. Vitousek (2011). Principles of Terrestrial Ecosystem Ecology, latest edition, Springer (e-book).