

SEMESTER II**ZY2B02U Core Course 2****BIODIVERSITY AND MODERN SYSTEMATICS****36 hrs****Credits 2****Objectives:**

- To create appreciation on diversity of life on earth
- To understand different levels of biological diversity
- To familiarize taxa level identification of animals
- To learn biodiversity estimation techniques
- To create interest for conservation of biodiversity

Pre requisite:

- Basic knowledge on the living world, plant and animal kingdom
- Knowledge on biodiversity and its conservation
- Knowledge on biological classification and representative organism of major taxa

PART I: BIODIVERSITY**(26 Hrs)****Module I – Introduction to Biodiversity****(2 hrs)**

Definition

Historical perspective

Concepts –

Nature – environment – biodiversity

Scope and importance

Core Readings

Chapman J.L. & M.J. Reiss 2006 Ecology, Principles and Applications. Sec Edition Cambridge University Press.

Supriyo Chakraborty.2004 *Biodiversity*. Pointer Publishers, Jaipur, India.

Thomas AP.,(Editor) 2009 Biodiversity,Scope and Challenges- Green Leaf Publications Kottayam

Wilson E.O., 1988 (Editor). *Biodiversity*. National Academy press, Washington DC, USA.

Module II – Levels of biodiversity (5 hrs)

Genetic, Species, Ecosystem

Domesticated, Microbial diversity

Distribution of biodiversity on earth

Tropical, temperate and polar

Landscapes and interactions

Biodiversity hotspots

Core Readings

Chapman J.L. & M.J. Reiss 2006 Ecology, Principles and Applications. Sec Edition Cambridge University Press.

Myers, Norman.1984. *The Primary Source: Tropical Forests and Our Future*. W.W. Norton & Company, NY.

Myers,N., Mittermiere,R.A., Mittermeier,C.G., Dea Fonseca,G.A.B and J.Kent. 2000. Biodiversity hotspots for conservation priorities. *Nature*, 403:853-858.

Supriyo Chakraborty.2004 *Biodiversity*. Pointer Publishers, Jaipur, India.

Wilson E.O., 1988 (Editor). *Biodiversity*. National Academy press, Washington DC, USA.

Module III – Values of biodiversity (4 hrs)

Direct use value

Indirect use value

Non use value

Ecosystem services

Core Readings

Myers, Norman.1984. *The Primary Source: Tropical Forests and Our Future*. W.W. Norton & Company, NY.

Myers,N., Mittermiere,R.A., Mittermeier,C.G., Dea Fonseca,G.A.B and J.Kent. 2000. Biodiversity hotspots for conservation priorities. *Nature*, 403:853-858.

Supriyo Chakraborty.2004 *Biodiversity*. Pointer Publishers, Jaipur, India.

Module IV – Threats to biodiversity (5 hrs)

Types of threats

Habitat loss, man- wildlife conflict (with case studies)

Invasive species

Pollution

Over exploitation and human population

Climate change

Core Readings

Chapman J.L. & M.J. Reiss 2006 Ecology, Principles and Applications. Sec Edition Cambridge University Press.

Wilson E.O., 1988 (Editor).*Biodiversity*. National Academy press, Washington DC, USA.

Module V – Biodiversity conservation and management (6 hrs)

Conservation strategies

In situ, ex situ

National parks, Sanctuaries and Biosphere reserves

International efforts

Convention on Biological Diversity (CBD)

IUCN- WCMC, UNEP

Legal measures

Wild life Protection Act, 1972

The Environment Protection Act, 1986

Forest (Conservation) Act1980, 1988

Biodiversity Act 2002

Biodiversity rule 2004

National biodiversity action plan

People's participation – Peoples biodiversity register (PBR)

Local initiatives

Core Readings

A.P.Thomas(Editor)2009 Biodiversity –Scope&Challenges .Green leaf publications .Kottayam

Andrew S. Pullin 2002. *Conservation Biology*. Cambridge University Press, Cambridge, UK.

Chapman J.L. & M.J. Reiss 2006 *Ecology, Principles and Applications*. Sec Edition Cambridge University Press.

Wilson E.O., 1988 (Editor).*Biodiversity*. National Academy press, Washington DC, USA

Module VI – Biodiversity estimation – tools and techniques (4 hrs)

Sampling techniques -

 Quadrat

 Line transect

Measurements

 Density

 Abundance

 Frequency

Biodiversity indices – concepts

 Shannon-Weiner, Simpson

Core Readings

Anne E. Magurran 2004. *Measuring Biological Diversity* .Blackwell Publishing, MA, USA.

PART II – MODERN TAXONOMY (10 hrs)

Module VII – Taxonomical Principles (6 hrs)

Brief history

Concepts and definition

Approaches of taxonomy

Molecular taxonomy

Importance of classification

Phylogeny and Taxonomy– Tree of Life, bar coding of life

Zoological nomenclature

 International Code of Zoological Nomenclature (ICZN)

Core Readings

Kapoor ,V.C.1998. Theory and Practice of Animal Taxonomy. Oxford and IBH Pub.Co, New Delhi.

Module VIII – Tools and techniques**(4 hrs)**

Identification Keys

Dichotomous keys (Single access key)

Polytomous key

Multi access key

Advantages and disadvantages

Core Readings

Kapoor ,V.C.1998. Theory and Practice of Animal Taxonomy. Oxford and IBH Pub.Co, New Delhi.

Selected Further Readings

Andrew S. Pullin 2002. *Conservation Biology*. Cambridge University Press, Cambridge, UK.

Anne E. Magurran 2004. *Measuring Biological Diversity* .Blackwell Publishing, MA, USA.

Chapman J.L. & M.J. Reiss 2006 Ecology, Principles and Applications. Sec Edition Cambridge University Press.

Daily,G.C. (Ed.), 1997.*Nature's Services : Societal Dependence on Natural Ecosystems*. Island Press, Washington D C.

Forman, R.T and M. Gordaon. 1986. *Landscape Ecology*. John Wiley & Sons, NY, USA.

Kapoor ,V.C.1998. Theory and Practice of Animal Taxonomy. Oxford and IBH Pub.Co, New Delhi

Karunakaran, C.K. 2003. Politics of vanishing forests in Kerala. Kerala Sastra Sahitya Parishat, Thiruvananthapuram.

Land resource based perspective plan for 2020 AD. Kerala State Land Use Board, Thiruvananthapuram

Myers, Norman.1984. *The Primary Source: Tropical Forests and Our Future*. W.W. Norton & Company, NY.

- Myers,N., Mittermiere,R.A., Mittermeier,C.G., Dea Fonseca,G.A.B and J.Kent.
2000. Biodiversity hotspots for conservation priorities. *Nature*, 403:853-858.
- Nair, K.N.S and Parameswaran,P.1976. *Keralathinte Sampath (Wealth of Kerala)*. Kerala Sastra Sahithya Parishad, Trivandrum, Kerala.
- Nair, M.P., Pushpangathan, P., Rajasekharan, S.,Narayanan Nair.K. and Dan Mathew. “*Jaivavaividhyam*” (Biodiversity). State Institute of Languages, Thiruvananthapuram
- State of the Environment Report, Kerala. (Annual Publication), Kerala State Council for Science, Technology and Environment, Thiruvananthapuram
- Supriyo Chakraborty.2004 *Biodiversity*. Pointer Publishers, Jaipur, India.
- Thomas A.P.,(Editor) 2009 Biodiversity scope & challenges. Green Leaf publications Kottayam
- Wilson E.O., 1988 (Editor).*Biodiversity*. National Academy press, Washington DC, USA.

Web Resources

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| http://www.ncbi.nlm.gov . | http://tolweb.org |
| http://www.biosis.org | http://ucmp.berkely.edu |
| http://species.enviroweb.;org | http://iczn.org |
| http://www.unep.org | http://www.iucn.org |
| http://www.cbd.org | |