Darrang College (Autonomous), Tezpur-784001

Syllabus for FYUGP

MDC-01033

Basics in Life Sciences

Approved by :

Academic Council vide Resolution no. 04, dated- 12/08/2025

FYUGP 1st SEMESTER
Multi Disciplinary Course
Option: Life sciences & Environment
MDC- Basics in Life Sciences
Paper Code: MDC01033

Course objectives:

The paper will provide a comprehensive overview of topics in plant science, anthropology, Zoological Science, and the applications of life science. Students will gain knowledge and understanding of the general features of organisms, the principles and practices in these areas, and the significance of these fields in various contexts.

Learning outcomes:

By completing the paper, students will -

1. Learn the general features of organisms like bacteria, viruses, algae, fungi, bryophytes, pteridophytes, gymnosperms, and angiosperms; about economic botany, disease management, breeding methods, crop domestication, and the role of national institutes in plant breeding; and the importance of agriculture in the national economy.
2. Gather knowledge on the mechanisms of evolution in mammals, primates, modern apes, and human evolution through fossil evidence; explore racial criteria, classification, and elements in India, along with basic concepts in genetics and heredity.
3. Learn about the principles of aquaculture, freshwater aquaculture in India and the North Eastern States, artificial fish breeding, integrated fish farming, and the market potential of aquatic organisms. They will also study sericulture, including races, economic advantages, and types of silk produced, as well as the importance and history of apiculture and bee rearing techniques.
4. Explore biotechnology, including its origin, history, scope, and definition. They will learn about genes, genetic engineering, DNA, RNA, PCR, molecular markers, cloning, and sequencing. The unit also covers the applications of biotechnology in medicine, agriculture, the environment, food, and industry.

THEORY [Total no. of contact classes: 45; Credits: 3]

Unit 1: Basics of Plant science No. of Contact Classes:12

General features of Bacteria, Viruses, Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms; Elements ofeconomic botany; integrated diseases management;Breeding methods for self-pollinated, cross-pollinated and clonally propagated crops; Crop domestication; Objectivesand accomplishments in plant breeding and the role of National institutes; Importance of Agriculture in national economy.

Unit2:Basics of Anthropology No. of Contact Classes:10

Basic concepts: mechanism of evolution of life; Mammal, Primate, Modern apes, Man's place in the animal kingdom,Fossil evidence of human evolution; Racial criteria, Major races, Racial classification, Racial elements in India; Genetics, Heredity.

Unit3:Basics in Economic Zoology No. of Contact Classes:13

Aquaculture:Basic principles of aquaculture; Prospects & Challenges of Aquaculture in North Eastern States; Diversification of Aquaculture,Induced breeding& larval rearing, integrated& composite fishfarming, Pearl Culture, Prawn Culture, Crustacean and Crab Culture, Post harvest Technology, Fish Preservation: principle & practices.

Sericulture:Origin and history; Races & classification of silkworm;economic advantages; scope of sericulture in India; Domesticated and semi domesticated Silk worm of NE Indiaand their economic viability. Culture of Silk worm. Propagation of food plants of Silk worm. Sericulture as an entrepreneurship venture, Natural dye of silk

Apiculture: General morphology& behaviour of boney bee, Importance and history of Honey bee culture in NE India. Diversity &major types of economically important boneybees in NE India. Selection of bee species for apiculture; Artificial Bee Rearing (Newton and Langstroth box).

Unit4: Applications of life science No. of Contact Classes:10

Origin, history, scope and definition of biotechnology, concept of gene, gene manipulation & genetic engineering. Concept of DNA, RNA, PCR, molecular markers, cloning and sequencing. Applications of biotechnology in medicine, agriculture, environment, food, and industry.

Reading list:

1. Ahsan J, Sinha SP (2010) *A Hand Book on Economic Zoology*, S Chand Publishing.
2. Das BM (1980) *Outlines of Physical Anthropology*. Kitab Mahal Publication.
3. Ember CR, Ember M, Peregrine PN (2011). *Anthropology*. Pearson Education Asia, Singapore.
4. Gardner A, Davies T (2012) *Human Genetics*. Viva Books Pvt Ltd., Delhi, India.
5. Graham LE, Graham JM, Wilcox LW (2013) *Plant Biology*, 2nd edition, Pearson Education, Inc., Upper Saddle River, NJ.
6. Harris M (1991) *Cultural Anthropology*, Harper & Row, New York, NY
7. Kochhar SL (2016) *Economic Botany*, Cambridge University Press.
8. Lewin R (1998) *Principles of Human Evolution*. Blackwell Sciences Inc. USA
9. Lewis B (2004) *Genes VIII*, 3rdEdition, Oxford University & Cell Press, NY.
10. Nicholl DST (2008) *Introduction to Genetic Engineering*, 3rd edition, Cambridge Universitypress, UK.
11. Pillay TVR (2005) *Aquaculture - Principles and Practices*, Wiley-Blackwell.
12. Raven PH, Evert RF, Eichhorn SE (2005)*Biology of Plants*, 7th edition, W. H. Freeman and Company, New York, NY.
13. Stanford C, Allen SJ, Anton CS (2013) *Biological Anthropology: The Natural History of Mankind*, 3rdedition. Pearson India Education Services, Noida.
14. Swindler DR (2009) *Introduction to the Primates*. Overseas Press India Pvt. Ltd., New Delhi, India.
15. Thieman WJ, PalladinoMA(2021) *Introduction to Biotechnology*, Pearson publisher, Boston, MA.