

SARDAR PATEL UNIVERSITY
SECOND YEAR B.SC. (FOURTH SEMESTER)
BIOLOGY
US04CBIO21 (T) AQUATIC BIOLOGY
(Four Credit Course, Four hours per week)
(Effective from June 2019)
(Total Marks 100, Internal-30 marks, External 70-marks)

UNIT 1: AQUATIC BIOMES

Brief introduction of the aquatic biomes: Fresh water ecosystem (Lakes, wetlands, streams and rivers), Estuaries, intertidal zone, oceanic pelagic zone, marine benthic zone and coral reefs. Salinity and density of Sea water, Continental shelf, Adaptations of deep sea organisms, Sea weeds.

UNIT 2: FRESHWATER BIOLOGY

Lakes: Origin and classification, Lake as an Ecosystem, Lake morphometry, Physico-chemical Characteristics: Light, Temperature, Thermal stratification,

Streams: Different stages of stream development, Physico-chemical environment, Adaptation of hill-stream fishes.

Wetlands:

Definition, types of wetland (fresh water and marine): ecological significance of wetlands; threats of wetlands; wetland conservation and management; Ramsar Convention, 1971; major wetlands of Gujarat

Unit :3 Aqua culture

Definition and scope, Global scenario of aquaculture, Prospects of aqua culture for future development, types of aqua culture- Pond culture, Monoculture, Polyculture

Important terms -Fish farming, Prawn farming, Oyster farming, Mariculture, Multi trophic aqua culture

Different levels of aquaculture, aquaculture methods- conventional and non conventional, Harvesting, Handling and transportation of fresh fish, fish as food, Processing of Fish and other products, Quality control of aquaculture products, Aquaculture economics,

UNIT 4: Water treaties and case studies

Major laws and treaties National water policy; water pollution (control and prevention) Act 1972; National River linking plan: ecological and economic impacts. Case studies on River: Indus water treaty; Ganges water treaty; Teesta water treaty Kaveri and Krishna river water disputes, Multipurpose river valley projects in India with its environmental and social impacts, Case studies of dams - Narmada and Tehri dam – social and ecological losses versus economic benefits, International conflicts on water sharing between India and her neighbours, Agreements to resolve these conflicts.

Suggested Readings :

1. Bansil, P.C. 2004. Water Management in India. Concept Publishing Company, India.
2. Brebbia, C.A. 2013. Water Resources Management VII. WIT Press.
3. CEA. 2011. Water Resources and Power Maps of India. Central Board of Irrigation & Power.
4. Grumbine, R.E. & Pandit, M.K. 2013. Threats from India's Himalaya dams. Science 339: 36- 37.
5. Loucks, D.P., Stedinger, J.R. & Haith, D. A. 1981. Water Resource Systems Planning and Analysis. Englewood Cliffs, NJ, Prentice Hall.
6. Mays, L.W. 2006. Water Resources Sustainability. The McGraw-Hill Publications.
7. Schwarzbach & Zhang, 2003. Fundamentals of Groundwater. John Willey and Sons.
8. Souvorov, A.V. 1999. Marine Ecogonomics: The Ecology and Economics of Marine Natural Resource Management. Elsevier Publications.
9. Vickers, A. 2001. Handbook of Water Use and Conservation. WaterPlow Press.

(* Designed following UGC curriculum)

SARDAR PATEL UNIVERSITY
SECOND YEAR B.SC. (FOURTH SEMESTER)
BIOLOGY
US04CBIO22 (T) ECONOMIC BOTANY
(Four Credit Course, Four hours per week)
(Effective from June 2019)
(Total Marks 100, Internal-30 marks, External 70-marks)

UNIT 1: CEREALS & LEGUMES

Wheat and Rice (origin, morphology, processing and uses); Brief account of millets.

Origin, morphology and uses of Chick pea, Pigeon pea and fodder legumes.
Significance of Cereals and legumes

Drug-Yielding plants : Therapeutic and habit-forming drugs with special reference to Cinchona, Digitalis, Papaver and Cannabis; Tobacco (Morphology, processing, uses and health hazards).

UNIT 2: SOURCES OF SUGARS AND SPICES

Morphology and processing of

Sugarcane : products and by-products of sugar industry. Potato morphology, propagation and uses.

Spices : Listing of important spices, their family and part used.

Economic importance with special reference to **fennel, saffron, clove and black pepper**

UNIT 3: Timber, Rubber and Fibers

Timber plants : General account with special reference to Teak and Pine.

NATURAL RUBBER: Para-rubber : tapping, processing and uses.

Fibers : Classification based on the origin of fibers; Cotton, Coir and Jute (morphology, extraction and uses).

UNIT 4: BEVERAGES AND OILS

Beverages : Tea, Coffee - Morphology, processing and uses.

Sources of oils and fats : General description, classification, extraction, their uses and health implications of Groundnut, Coconut, Linseed, Soybean, Mustard (Botanical name & family).

Essential oils: General account, extraction methods, comparison with fatty oils and their uses.

SUGGESTED READINGS:

1. Kochhar, S.L. (2012). Economic Botany in Tropics, MacMillan & Co. New Delhi, India.
2. Wickens, G.E. (2001). Economic Botany: Principles & Practices. Kluwer Academic Publishers, The Netherlands.
3. Chrispeels, M.J. and Sadava, D.E. 1994 Plants, Genes and Agriculture. Jones & Bartlett - Publishers.

(* Designed following UGC curriculum)

SARDAR PATEL UNIVERSITY
SECOND YEAR B.SC. (FOURTH SEMESTER)
BIOLOGY
US04CBIO23 (P) AQUATIC BIOLOGY
(Two Credit Course, Four hours per week)
Effective from June 2019
(Total Marks 50, External marks- 50)

1. Determine the area of a lake using graphimetric and gravimetric method.
2. Study of important macrophytes from nearby wetland
3. Study of phytoplanktons and zooplanktons present in a aquatic ecosystem.
4. Study of coral reef
5. Study of sea weeds
6. Determine the amount of Turbidity/transparency,
7. Free Carbon dioxide, Alkalinity (carbonates & bicarbonates) in water collected from a nearby lake/ water body.
8. Measurement of Dissolved Oxygen from pond water
9. Instruments used in limnology (Secchi disc, Van Dorn Bottle, Conductivity meter, Turbidity meter, PONAR grab sampler) and their significance.
10. A Project Report on a visit to aquatic bodies- pond/ lake
11. A project report on visit to Marine bioreserve
12. Visit to aquafarm industry
13. Activities- aqua culture products –chart preparation
14. Activities- National river linking project – chart preparation

SUGGESTED READINGS:

- Anathakrishnan : Bioresources Ecology 3rd Edition
- Goldman : Limnology, 2nd Edition
- Odum and Barrett : Fundamentals of Ecology, 5th Edition
- Pawlowski : Physicochemical Methods for Water and Wastewater Treatment, 1st Edition
- Wetzel : Limnology, 3rd edition
- Trivedi and Goyal : Chemical and biological methods for water pollution studies

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1. Cereals: Wheat (habit sketch, L. S/T.S. grain, starch grains, micro-chemical tests)
2. Rice (habit sketch, study of paddy and grain, starch grains, micro-chemical tests).
3. Legumes: Soybean, Groundnut, (habit, fruit, seed structure, micro-chemical tests).
4. Sources of sugars : Sugarcane (habit sketch; cane juice- micro-chemical tests),
Potato (habit sketch, tuber morphology, T.S. tuber to show localization of starch grains,
w.m. starch grains, micro-chemical tests).
5. Spices: Black pepper, Fennel and Clove (habit and sections).
6. Beverages: Tea (plant specimen, tea leaves), Coffee (plant specimen, beans).
7. Sources of oils and fats: Coconut- T.S. nut, Mustard–plant specimen, seeds; tests for fats
in crushed seeds.
8. Essential oil-yielding plants: Habit sketch of Rosa, Vetiveria, Santalum and Eucalyptus
(specimens/photographs).
9. Rubber: specimen, photograph/model of tapping, samples of rubber products.
10. Drug-yielding plants: Specimens of Digitalis, Papaver and Cannabis.
11. Tobacco: specimen and products of Tobacco.
12. Woods: Tectona, Pinus: Specimen, Section of young stem.
13. Fiber-yielding plants: Cotton (specimen, whole mount of seed to show lint and fuzz;
whole mount of fiber and test for cellulose), Jute (specimen, transverse section of stem,
test for lignin on transverse section of stem and fiber).
14. Submission – chart preparation of types of fibers and products
(* Designed following UGC curriculum)