**BUNDELKHAND UNIVERSITY, JHANSI**

*SYLLABUS* FOR UNDERGRADUATE COURSES B.SC. (HONS.)

**Drinking water quality assessment**

Total Credits: 4

***Unit 1:Water source and pollution***

Introduction about water resources.Various forms of water resources.Quantity of waterin different resources/global distribution of water.Concepts of water stress and adaptations.Global water cycle.Surface water resources.Underground water resources.Types of aquifers.Effects of over exploitation of Underground water.Principal sources and causes of Groundwater Pollution.Plume movement in groundwater aquifers.Fluoride Problem in Drinking water & their removal techniques.Arsenic contamination in Groundwater.

***Unit – 2: Basics of drinking water***

Raw water sources, i.e., rivers, lakes, reservoirs, groundwater, that can be exploited for drinking water production. Basic drinking water chemistry.

***Unit – 3: Water Quality Fundamentals***

* Quality aspects of water :
  + 1. Physical aspects : temperature, colour, turbidity , tastes and odour , pH and conductivity.
    2. Chemical aspects : salinity(Na and Cl ions) and TDS, DO, BOD & COD
    3. Biological aspects : Bacteria and Virus
* Tolerance limits of water quality for irrigation purposes.
* Colour of water under different pH range (Based on various Indicator).
* Treatment of water for removal of taste &odours.

***Unit – 4: Treatment methods for drinking water***

Introduction to common methods for drinking water treatment from different sources: sand and membrane filtration, coagulation/flocculation, sedimentation, water softening, softening, ion exchange, adsorption on granular activated carbon, different disinfection methods.

***Unit – 5: Drinking water management***

Freshwater Crisis. Management of Water Availability:- Surface water development, ground water development, weather modification and water conservation; inter basin transfer of water, wastewater reuse, desalination and other approcaches Management of extremes such as flood-structral and non-structural approach, droughts

**Suggested readings**

Birde G.S. and Birde J.S. (2004) Water Supply and Sanitary Engineering, 7th ed., New Delhi, DhanpatRai Publishing.

Chatterjee A.K. (2010) Water Supply, Waste Disposal and Environmental Engineering, 8th ed., New Delhi, Khanna Publisher.

Eckenfelder W.Jr. (1999) Industrial Water Pollution Control, 3rd ed., New York, McGraw-Hill.

Metcalf and Eddy (2003) Wastewater Engineering: Treatment and Reuse, 4th ed., New Delhi, Tata McGraw-Hill.

Nathanson J.A. (2009) Basic Environmental Technology: Water Supply, Waste Management and Pollution Control, 4th ed., New Delhi, PHI Learning.

*Drinking Water - Principles and Practice* by De Moel, Verberk, and Van Dijk.