Govt Degree College, Baramulla

Syllabus of Water Management for UG programmes Major (Semester 5)
Course Title: Water Resource Management **Credits: Theory: 4, Practical: 2**
Course code: BWM22C501 **Course Type: (Major/Minor)**

Learning Outcomes:

- The student is expected to learn different tools, techniques and policies for management and conservation of water resources which are crucial for the sustenance of life on earth.
- Student will be able to apply critical thinking And problem solving skills to address complex water management challenges.

Unit-1: Integrated Water Resource Management
Integrated water resource management: concept, history and theoretical perspectives, Principles and tools for practising IWRM, Issues and challenges in IWRM, Corporate social responsibility in water resource management

Unit-2: Water shed Characteristics
Watershed types and functions, Characteristics of watershed: Geology, Hydrology, vegetation, land use, climate, size, shape, slope, climate, drainage, socio-economics. Estimating the soil loss, Universal Soil Loss Equation (USLE), Ecosystem services of watershed.

Unit-3: Water Harvesting and conservation
Water harvesting- Concept and importance, Classification of water harvesting technique like; Ground water harvesting, Runoff harvesting, Flood water harvesting, Rain water harvesting, Roof water harvesting. Rainwater harvesting- types and components. Design of small water harvesting structure like; farm ponds, Percolation tanks, Check dams, Roof Harvesting, Vegetation and plantation.

Unit-4: Watershed planning and management
Concept and framework of watershed management, multi-objective planning, prioritization and restoration, Land-use practices, community participation, integrated watershed development, watershed management strategies, project implementation, monitoring and evaluation of watershed management, Cost benefit analysis of watershed project.

Practical:
1. Determination of importance value index (IVI) of different plant species in a watershed.
2. Application of diversity indices in a watershed.
3. Calculation of Water Pollution Index.
4. Measurement of area and volume of a water body.
5. Measurement of soil erosion through soil loss equation.
6. Case studies based on rainwater harvesting techniques.
7. Success story of watershed management in India eg; Ganga action plan.
8. A field visit to an aquatic ecosystem.

Suggested Readings:
1. D. Borchardt, J.J. Bogardi and R.B. Iibish (Editors). 2016. Integrated Water Resources Management: Concept, Research and Implementation. Springer.
2. D. Borchardt abd Ralf iiblish (editors). 2013. Integrated Water Resource Management in a changing world. IWA publishing.
3. A. Castellitti and R.S.Sessa (Editors). 2007 Topics on System Analysis and Integrated Water Resource Management. Elsevier
4. B. Gopal, E.R.N. Gunawardena, and H.Kotagama (Editors). Ecosystems and Integrated Water Resources Management in South Asia. Routledge. 16
5. B. Vasantha Kumar. 2010. Aquatic Ecosystems and its Management. Daya Publishing House.
6. S.Jorgensen, J.G. Tundisi, and T.M. Tundisi. 2020. Handbook of Inland Aquatic Ecosystem Management (Applied Ecology and Environmental Manegement). CRC Press.

7. Q. Zhu, J.G.Y. Li and C. Ma (Editors). 2015. Rainwater harvesting for agriculture and water supply. Springer.
8. R.Avis and M.Avis. 2019. Rainwater harvesting: A guide to human scale system design. New Society Publishers.
9. I.W. Heatcole. 2009. Integrated Watershed Management. Wiley Publishing.
10. R.Rajora. 1998. Integrated Watershed Management. A Field Manual. Rawat Publications.
11. S, Rajvir. 2000. Watershed Planning and Management. Yash Publications.
12. J. Smyle, Crispino Lobo, Grant Milne, and Melissa Williams. 2014. Watershed Development in India an Approach Evolving Through Experience. Agriculture and Environmental Services