



AMITY UNIVERSITY

— UTTAR PRADESH —

FORMAT FOR COURSE CURRICULUM

Course Title: Advances in water quality and management

Course Code: ESCM904

Credit Units:4

Course Objectives: The aim of this course unit is to introduce the basic idea of water resource availability, water resources problems both in terms of quantity and quality and different corrective measures opted throughout the world to solve problem associated with water resources to our students.

| L | T | P/S | SW/F W | TOTAL CREDITS UNIT |
|---|---|-----|-----------|--------------------------|
| 4 | - | - | - | 4 |

Pre-requisites: Bachelor in science discipline

Student Learning Outcomes: By the end of the course students will:

- Understand the global scenario of water resource distribution; water quality concerns and remedial measures
- Able to monitor water quality of surface and ground water in term of physical, chemical and biological parameters.
- Get insight of most debated topics in the field of water quality and management through case studies.

Course Contents/Syllabus:

| | Weightage (%) |
|--|---------------|
| Module I Water resources management: Global water cycle; Different component of water cycle including surface runoff, infiltration and storage; Factors affecting surface and ground water resources; Concept of watershed and watershed management; Construction of multipurpose dams and their overall impact on environment and society (Case studies: Aswan dam, Sardar sarovar dam); Concept of environment flow requirement for river systems; Exploitation of ground water resources and its harmful impact. | 10 |
| Module II Water quality and standards – Status and Trends of Water Quality(Surface, ground and drinking water); water quality parameters (physical, chemical and biological); Major sources of water quality (Weathering, atmospheric | 15 |

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| deposition and human input); Water pollutant class (organic pollutant, inorganic pollutant, plant nutrients, Toxic metals); Effects of Water Pollution (Eutrophication , water born diseases, metal toxicity); water quality standards for domestic, agricultural and industrial uses; Water quality index and its significance: Water quality of Indian rivers (Case study GAP, YAP). | |
| Module III | 30 |
| Water quality monitoring – Measurement of physical, chemical and biological water quality parameter using analytical instruments ; Measurement of DO, BOD, COD and MPN for water bodies; Theory and principle of spectroscopy (UV-VIS Spectroscopy, Flame Photometer, AAS, AES); Theory and principle of Chromatography (Thin layer, Ion exchange chromatography, Column chromatography; HPLC); Auto analyzer for nutrient measurement; DOC analyzer; Tracer induction study for dispersion and dilution analysis. | |
| Module IV | 30 |
| Water and waste water treatment- Sources of Water Supplies; Water Transmission; Physical and Chemical Treatment Processes for Water Supply; Wastewater Characteristics; Wastewater Collection Facilities; Wastewater Pretreatment; Primary, Secondary and Tertiary Treatment Technologies; Control of non-point sources such as agriculture runoff and storm water discharge; Removal of toxic elements(fluoride, Arsenic) from drinking water | |
| Module V | 15 |
| Current issues in water resources- River restoration case studies from world around; Indian river linking project; Water dispute (National and International); Sustainable use of water resources in agriculture and farm production; Rain water harvesting and ground water recharge; Impact of climate change on water resources. | |

Pedagogy for Course Delivery: Course will be delivered through both power point presentation and black board teaching. Students will be provided with reference materials in form of handouts or PPTs. Regular internal assessment will be done through class seminar and class test for evaluating the continuous progress of students.

Lab/ Practicals details, if applicable: NA

Assessment/ Examination Scheme:

| Theory L/T (%) | Lab/Practical/Studio (%) | End Term Examination |
|-----------------------|---------------------------------|-----------------------------|
| 100 | | 70 |

Theory Assessment (L&T):

| Continuous Assessment/Internal Assessment | | | | | End Term Examination |
|--|-----------|-------------|-----------|--------------|-----------------------------|
| Components (Drop down) | CT | Att. | HA | S/V/Q | |
| Weightage (%) | 10 | 5 | 5 | 10 | 70 |

Lab/ Practical/ Studio Assessment: NA

Text & References:

- The Geochemistry of Natural waters: J.I.Drever; Prentice Hall, Englewood Cliffs, New Jersey 07632.
- Environmental Chemistry; A.K. De , New Age International, New Delhi. 2000.
- Instrumental Methods of Analysis: H.H.Willard, L.Merritt, J.A.Dean, F.A. Settle; CBS Publishers & Distributors Pvt. Ltd.
- Chemical composition of rivers and lakes data on geochemistry; Livingstone, D.A. (1963)..Ch-6,USGC Prof. Pap.440G,G1-G64.
- Study and interpretation of the chemical characteristics of natural water; Hem,J. D. (1985).USGC Water-supply paper.2254.

- Global environment: water, air and geochemical cycles; Berner,E.K and Berner,R.A, (1996).. Prentice hall, New Jersey,376p.
- Water (Quantity – Quality perspective in South Asia); Subramanian, V. (2000). Kingston International publisher, Surrey,United Kingdom.
- Analytical Chemistry; W.J. Murphy, American Chemical Society, USA. 1977.