# GUJARAT TECHNOLOGICAL UNIVERSITY

## CIVIL (WATER RESOURCES ENGINEERING) (33)
WATER USE MANAGEMENT

**SUBJECT CODE**: 2723305
SEMESTER: II

**Type of course: Irrigation and drainage**

**Prerequisite:** Fundamental knowledge of irrigation engineering, soil water plant relationship, consumptive use of water.

**Rationale:** Students will be able to understand irrigation efficiency, methods of irrigation, surface and sub-surface drainage system, automation and regulation of canal.

**Teaching and Examination Scheme:**

| Teaching Scheme | | | Credits | Examination Marks | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|
| L | T | P | C | Theory Marks | | Practical Marks | | | | |
| | | | | ESE (E) | PA (M) | PA (V) | | PA (I) | | |
| | | | | | | ESE | OEP | PA | RP | |
| 3 | 2# | 0 | 4 | 70 | 30 | 30 | 0 | 10 | 10 | 150 |

**Content:**

| Sr.No | Topics | **Teaching Hrs.** | **Module Weightage** |
|---|---|---|---|
| 1. | Soil surveys and irrigability classification, water quality, Irrigation water standards, Soil-water-plant relationship, Crop planning and crop patterns, Determination of consumptive use of crops, Irrigation efficiency, Irrigation scheduling, Methods of crop improvement, Soil and fertility management, Irrigation water application methods-surface methods, Simulation of flow in surface irrigation systems, Performance evaluation, Sensitivity analysis, parameter estimation, sprinkler and drip irrigation, Drainage of water-logged areas, Surface and subsurface drainage systems, Conjunctive use of surface water and groundwater, Saline and alkaline soils, Plants response to saline soils, Salt-tolerant crops, Reclamation and management of salt-affected soils, Measurement of irrigation water, Water Quality modelling, Desalination of irrigation water, Remote Sensing. | 30 | 70 |
| 2 | Automation and control and regulation of canals, Operation and management of irrigation projects, Command area development organization and their role in water management, Modernization of existing irrigation projects. | 12 | 30 |

**Reference Books:**


1. Irrigation-Theory and practice - A.M.Michael
2. Modern irrigated soils - D.W.James, R.J.Hanks & Jurinak
3. Crop water requirements FAO publications No. 24
4. Arid Land Irrigation in Developing countries, Environmental problems & effects Pergamon press Oxford University 1977
5. Sprinkler Irrigation – Melvyn Kay
6. Drip Irrigation – S. K. Sharma
7. Surface Irrigation Systems – Walker & Skogerboe
8. Drainage Manual


**List of Tutorial:**

1. Water use management
2. Classify the methods of irrigation
3. Explain soil water relationship in detail
4. How will you determine consumptive use of water
5. Write short note: (a) Irrigation scheduling (b) Soil fertility management (c) Sprinkler irrigation (d) Drip irrigation (e) Conjunctive use of surface water and ground water (f) How the salt affected soil can be reclaimed
6. Discuss command area development

**Course Outcome:**

After learning the course the students should be able to: understand efficient use of water for irrigation with respect to soil and crop, quality of irrigation water and canal automation.

**Open Ended Projects:** soil moisture measurement, sprinkler and drip system planning and design, canal automation system laboratory model.

**Major Equipments: infiltrometer, open channel**

**List of Open Source Software/learning website:**

**http://en.wikipedia.org/wiki/Category:Hydraulic_engineering**

**Review Presentation (RP):** The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website.