

## 22IADE301 SPRINKLER AND MICRO IRRIGATION SYSTEMS

Hours Per Week :

L	T	P	C
1	0	2	2

**PREREQUISITE KNOWLEDGE:** Basics of irrigation and fertigation techniques.

### COURSE DESCRIPTION AND OBJECTIVES:

This course deals with the modern irrigation techniques to optimize irrigation water by micro irrigation systems. This course also helps students to acquaint knowledge in developing the layout and designing micro irrigation systems.

### MODULE-1

#### UNIT-1

4L+0T+8P=12 Hours

#### SPRINKLER IRRIGATION:

Sprinkler irrigation: Adaptability, problems and prospects, types of sprinkler irrigation systems.

#### UNIT-2

4L+0T+08P=12 Hours

#### DESIGN OF SPRINKLER IRRIGATION:

Design of sprinkler irrigation system: layout selection, hydraulic design of lateral, sub main and main pipe line, design steps, selection of pump and power unit for sprinkler irrigation system, performance evaluation of sprinkler irrigation system, uniformity coefficient and pattern efficiency.

#### PRACTICES:

- Study of different components of sprinkler irrigation system.
- Design and installation of sprinkler irrigation system for a small Garden and Field.
- Determination of precipitation pattern, discharge and uniformity coefficient.
- Cost economics of sprinkler irrigation system.

### MODULE-2

#### UNIT-1

4L+0T+8P=12 Hours

#### DRIP IRRIGATION:

Micro Irrigation Systems: Types-drip, spray and bubbler systems, merits and demerits, different components, fertigation, advantages and limitations of fertigation, fertilizers solubility and their compatibility, precautions for successful fertigation system, fertigation frequency, duration and injection rate, methods of fertigation.

#### UNIT-2

4L+0T+8P=12 Hours

#### LAYOUT OF DRIP IRRIGATION:

Design of drip irrigation system: General considerations, wetting patterns, irrigation requirement, emitter selection, hydraulics of drip irrigation system, design steps, necessary steps for proper operation of a drip irrigation system, maintenance of micro irrigation system, clogging problems, filter cleaning, flushing and chemical treatment.



Source : <https://1740009751.rsc.cdn77.org/sites/balkanbaba/docs/6fe98443f75e43594dc9cbf0a1ecb80e.jpg>

**SKILLS:**

- ✓ *Make a plan for designing and installing both the sprinkler and drip irrigation systems.*
- ✓ *Identify the suitable irrigation system based on water source, type of crop to be cultivated and economic analysis.*
- ✓ *Design venturi assembly for fertigation.*

**PRACTICES:**

- Study of different components of drip irrigation.
- Design and installation of drip irrigation system.
- Determination of pressure discharge relationship and emission uniformity for given emitter.
- Study of different types of filters.
- Determination of filtration efficiency.
- Determination of rate of injection and calibration for chemigation.
- Determination of rate of injection and calibration for fertigation.
- Design of irrigation and fertigation schedule for crops.
- Field visit to micro irrigation system and evaluation of drip system.
- Cost economics of drip irrigation system.

**COURSE OUTCOMES:**

Upon successful completion of this course, students will have the ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Apply the knowledge of micro irrigation system to reduce excessive usage of irrigation water	Apply	1	1, 2, 4, 7
2	Evaluate performance of sprinkler irrigation techniques with the help of uniformity coefficient and pattern efficiency	Evaluate	1	1, 2, 4, 5, 7
3	Analyze fertilizer application through micro irrigation system and propose remedial measures due to troubleshoot	Analyze	2	1, 2, 3, 4, 5, 6, 7
4	Design and development of drip irrigation systems	Create	2	1, 2, 3, 4, 5, 6, 7, 12
5	Problems associated with micro irrigation systems and propose solutions	Create	2	1, 2, 3, 4, 5, 6, 7, 12

**TEXT BOOKS:**

1. Michael A.M. "Irrigation: Theory and Practice" Vikas Publishing Vikas Pub. House New Delhi, 2012.
2. Mane M.S. and Ayare B.L. "Principles of Sprinkler Irrigation systems" Jain Brothers, New Delhi, 2007.

**REFERENCE BOOKS:**

1. Keller Jack and Bliesner Ron D. "Sprinkle and Trickle Irrigation. Springer Science business" Media, New York, 2001.
2. Mane M.S and Ayare B.L. and MagarS.S. "Principles of Drip Irrigation systems" Jain Brothers, New Delhi, 2006.
3. Michael AM, Shrimohan and KR Swaminathan. Design and evaluation of irrigation methods, (IARI Monograph No.1). Water Technology Centre, IARI New Delhi, 2009.