

**4CE54: IRRIGATION WATER MANAGEMENT**  
**CREDITS - 3 (LTP: 3,0,0)**

**Course Objective:**

1. Study the design aspects in border strip, check basin, furrow irrigation, sprinkler and drip irrigation methods.
2. Perform irrigation scheduling with operation and management of canals in command area.

**Teaching and Assessment Scheme:**

Teaching Scheme (Hours per week)			Credits	Assessment Scheme				Total Marks
L	T	P		C	Theory Marks		Practical Marks	
			ESE		CE	ESE	CE	100
3	0	0	3	60	40	00	00	

**Course Contents:**

Unit No.	Topics	Teaching Hours
1	<b>Introduction, Crop water requirement and land grading:</b> Importance of irrigation, Irrigation in world, India and Gujarat, water resources scenario in world, India and Gujarat, role of water in plant growth, water absorption by plants, transpiration, soil plant atmosphere system, extraction of water by plants from soil, soil water availability to plants, Estimation of crops water requirement, evapo-transpiration and consumptive use, methods of estimating evapo-transpiration, effective rainfall, irrigation water requirement, Land grading and field layout, criteria for land levelling, land leveling exercises.	10
2	<b>Methods of Irrigation:</b> Classifications, surface irrigation, subsurface irrigation methods, broad strip, check basin method, furrow irrigation method, adaptability and design aspects of these methods, Sprinkler irrigation, types, components, principles of design of sprinkler irrigation, moisture distribution patterns and uniformity of coverage, hydraulic design of sprinkler system, design problem, Drip irrigation method, layout and components, principles of design of drip irrigation, problems associated with drip irrigation system, Application of fertilizers and pesticides through pressurized irrigation systems.	14
3	<b>Irrigation efficiency &amp; Scheduling of irrigation:</b> Irrigation efficiency, components of project irrigation efficiency, water use efficiency, water storage efficiency, water application efficiency, water distribution efficiency, significance of irrigation efficiencies, improving irrigation efficiency Scheduling of irrigation, time of irrigation, critical stages of water need of crops, criteria of scheduling irrigation, frequency of irrigation, depth of irrigation.	08
4	<b>Problems associated with irrigated areas:</b> Water management in high water table area, Effects and causes of water logging, preventive measures for water logging, Prevention of high water table situation, land drainage, classification of drainage system, signs of bad drainage,	06

Unit No.	Topics	Teaching Hours
	Quality of irrigation water, quality of surface and ground water, irrigation with saline water, improving quality of saline water, leaching requirement for irrigation with saline water.	
5	<b>Management and Performance evaluation of canal system:</b> Management of canal irrigation, need for canal system management, inadequacies of canal irrigation management, objectives and criteria for good canal irrigation management, operation and maintenance of canal irrigation system, Performance evaluation of canal irrigation system, irrigation by rotation (Warabandi), water cooperative society. Automated control system in canal irrigation management.	07
<b>Total</b>		45

**List of References:**

1. A. M. Michael, "*Irrigation Theory and Practice*", 2<sup>nd</sup> edition, New Age Publication, New Delhi
2. G. L. Asawa, "*Irrigation Engineering*", New Age Publication, New Delhi, 2006
3. Dilip Kumar Majumdar, "*Irrigation Water Management*", Sixth Printing, PHI, New Delhi, 2010
4. H. Finkel, "*Handbook of Irrigation Technology (Vol. I & II)*", CRC Press, Florida, USA

**Course Outcomes (COs):**

**After learning the course the students shall be able to:**

1. Prepare layout of irrigation and drainage systems for fields.
2. Apply design aspects of border strip method, check basin method and furrow irrigation method.
3. Perform hydraulic design of sprinkler and drip irrigation system.
4. Calculate Irrigation efficiencies and understand scheduling aspects of irrigation system
5. Carry out performance evaluation of an irrigation system and understand the irrigation water management aspects.