DEPARTMENT OF AGRONOMY
Faculty of Agricultural Sciences
University of the Punjab, Lahore

Course Outline

Programme	B.Sc. (Hons.) Agriculture (Agronomy)	**Course Code**	AGR-303	**Credit Hours**	3 (2-1)
Course Title	**IRRIGATION AGRONOMY**				

Course Introduction

Some basic knowledge about water management and Irrigation.

Learning Outcomes

After studying this course, the students will be able to: -
1. Define basic terminologies regarding water management.
2. Understand the concept of water management.
4. Identify various techniques to conserve water and utilize that water for crop production.
5. Measure the moisture content in the soil.

	Course Content	**Assignments/Readings**
Week 1	**UNIT: 1** 1.1 Concept of Irrigation Agronomy	• Crop Management with a focus on soil and water by Khan, S. R.
	UNIT: 1 1.1.1 Definition of irrigation and agronomy 1.1.2 Types of Irrigation 1.1.3 Irrigation and effect of the environment	
	Practical: • Estimation of potential evapotranspiration by different methods • Empirical/Formulas-Based Methods	Internet Source
Week 2	**Unit-II** 1.2 Concept of water management 1.2.1 Definition of Water Management.	• Crop Management with a focus on Soil and Water by Khan, S. R.
	Unit-II 1.2.2 On-farm water management 1.2.3 Off-farm water management	
	Practical • Estimation of potential evapotranspiration by different methods • Combination Methods • Temperature-based methods	Internet Source

Week 3	**Unit-III** 1.3 Sources of irrigation water	• Crop Management with a focus on soil and water by Khan, S. R. A.
	Unit-III 1.3.1 Surface water 1.3.2 Rainfall	
	Practical: • Estimation of potential evapotranspiration by different methods. • Mass Transfer Methods	Internet Source
Week 4	**Unit-IV** 1.4 Efficient use of irrigation water in crop production	• Crop Management with a focus on soil and water by Khan, S. R. A.
	Unit-IV 1.4.1 Soil structure 1.4.2 Soil texture	
	Practical • Estimation of potential evapotranspiration by different methods • Radiation-Based Methods	Internet Source
Week 5	**Unit-V** 1.5 Irrigation scheduling	• Crop Management with a focus on soil and water by Khan, S. R. A.
	Unit-V 1.5.1 Types of water	
	Practical • Calculation of water use efficiency in field crops • Basic Water Use Efficiency (WUE) Formula	Internet Source
Week 6	**Unit-VI** 1.6 Water use efficiency in field crops	• Crop Management with a focus on soil and water by Khan, S. R. A.
	Unit-VI 1.6.1 Role of soil structure and texture on water holding capacity of soil	
	Practical • Calculation of water use efficiency in field crops • By using Agronomic methods	Internet Source
Week 7	**Unit-VII** 1.7 Irrigation water losses and their control through on-farm water management practices	• Crop Management with a focus on soil and water by Khan, S. R. A.
	Unit-VII 1.7.1 Movement of water in the soil	

	Practical • Calculation of water use efficiency in field crops • Discussing methods used in Pakistan	Internet Source
Week 8	**Unit-VIII** 1.8 Irrigation water losses and their control through on-farm water management practices	• Crop Management with a focus on soil and water by Khan, S. R. A.
	Unit-VIII 1.8.1 Definition of effective rainfall.	
	Practical • Calculation of water use efficiency in field crops • Types of Water Use Efficienc	Internet Source
Week 9	**MID TERM EXAM**	
Week 10	**Unit-X** 1.9 Current agro-technology for efficient use of irrigation water in crops	• Crop Management with a focus on soil and water by Khan, S. R. A.
	Unit-X 1.9.1 Effect of temperature, pressure, humidity, rainfall, wind speed, light intensity on soil moisture	
	Practical • Potential soil moisture deficit and its calculation • Calculation of Potential Soil Moisture Deficit	Internet Source
Week 11	**Unit-XI** 1.10 Current agro-technology for efficient use of irrigation water in crops	Crop Management with a focus on soil and water by Khan, S. R. A.
	Unit-XI 1.10.1 Effect of rainfall	
	Practical • Potential soil moisture deficit and its calculation • Factors Influencing PSMD	
Week 12	**Unit-XII** 1.11 Appropriate cropping patterns and water budgeting	• Crop Management with a focus on soil and water by Khan, S. R. A.
	Unit-XII 1.11.1 Different cropping patterns, Water budgeting according to rainfall	
	Practical • Measurement of rainfall	

	• Methods of measuring rainfall	
Week 13	**Unit-XIII** 1.12 Water requirement and water use efficiency of crops	• Crop Management with a focus on soil and water by Khan, S. R. A.
	Unit-XIII 1.12.1 Water requirement and water use efficiency of crops like wheat, groundnut, olives, grapes	
	Practical • Measurement of rainfall • Effect of different environmental factors on rainfall	Internet source
Week 14	**Unit-XIV** 1.13 Water harvesting and run-off farming.	• Crop Management with a focus on soil and water by Khan, S. R. A.
	Unit-XIV 1.13.1 Water harvesting techniques, 1.13.2 Watershed management	
	Practical • Potential soil moisture deficit and its calculation	
Week 15	**Unit-XV** 1.14 Irrigation systems	• Crop Management with a focus on soil and water by Khan, S. R. A.
	Unit-XV 1.14.1 Small dams 1.14.2 Mini dams 1.14.3 Drip irrigation system 1.14.4 Sprinkler irrigation system	
	Practical • Potential soil moisture deficit and its calculation • From plants and land	Internet source
Week 16	**Unit-XV** 1.15 Irrigation water pollution and measures to minimize it	• Crop Management with a focus on soil and water by Khan, S. R. A.
	Unit-XV 1.15.1 *Rodhkohi* system.	
	Practical • Potential soil moisture deficit and its calculation	
Week 17	**Unit-XVI** 1.16 Overview	
	1.16.1 Revision of Syllabus	• Crop Management with a focus on soil and water by Khan, S. R. A.

	Practical • Revision of syllabus • Discussion in class	
Week 18	**FINAL EXAM**	

Textbooks and Reading Material

1. Textbooks.
   In the detailed course outline, one may mention chapters of the textbook with the content topics
2. Suggested Readings
   Ali, M. H. 2010. Fundamentals of Irrigation and On-farm Water Management. Vol. 1, Springer, New York, USA.
   Ali, M. H. 2011. Practice of irrigation and on-farm water management volume 2, Springer, New York, USA.
   Choudhary, M. R. 2009. A Textbook of Irrigation and Drainage Practices for Agriculture. University of Agric. Faisalabad, Pakistan.
   Kirkham, M.B. (Editor). 2004. Water Use in Crop Production. Narosa Publishing House Pvt. Ltd. New Delhi, India.
   Michael, M.A. 2003. Irrigation Theory and Practice. Vikas
   Publishing House Pvt. Ltd., New Delhi. India.
   Sankara, R. G. H. and T. Y. Reddy. 2002. Efficient Use of Irrigation Water. Kalyani Publishers New Delhi, India

Note:

1. It is preferable to use the latest available editions of books. Mention the publisher & year of publication.
2. The References/ bibliography may by the typing manual of the concerned faculty/subject. Preferably follow the APA 7th Edition publication manual.

Teaching Learning Strategies

1. Lectures
2. Reports
3. Class discussion

Assignments: Types and Number with Calendar

1. Determination of water requirement of the crop
2. Impact of water On Crop growth
3. Global warming; effect on water availability
4. Determination of water use efficiency
5. Impact of Climate Warming and water shortage

Assessment

Sr. No.	Elements	Weightage	Details

1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on activities, short tests, projects, practicals, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on a term paper, research proposal development, field work report writing etc.