Syllabus for B.Sc. (Hons) Agriculture Year – II (Sem. IV)

Subject Code: 16AS0412

Subject Short Name: Agron. 4.6

Subject Name: Water Management

Objective:

1. To study the important properties of soil affecting water availability to crops and water requirement for optimum growth and development.
2. To study different methods of irrigation and water management practices of both field and horticultural crops and drainage.
3. To study the soil moisture conservation practices including management of rain water, watershed and command areas

Credits Earned: 2 Credits (1+1)

Course Outcomes: After completion of this course, Students will be able to

- Understand the principles of irrigation, soil-plant-water relationships, and water budgeting.
- Analyze different irrigation methods, including surface, subsurface, sprinkler, and drip irrigation.
- Evaluate irrigation scheduling, water use efficiency, and irrigation water quality management.
- Apply knowledge of irrigation systems, automation, and climate-based irrigation practices.
- Develop practical skills in soil moisture estimation, irrigation system layout, and water measurement techniques.

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	Mid Sem (M)	Progressive Assessment (PA)	Viva (V)	Term work (TW)	
1	0	2	2	40	20	20	10	10	100

Theory Content:

Unit	Topics	Contact Hours
1	Irrigation: definition, objectives and importance for plant growth	**1**

2	Water resources and irrigation development for different crops in India	**1**
3	Soil plant water relationships	**1**
4	Available and unavailable soil moisture, distribution of soil moisture, water budgeting, rooting characteristics, moisture extraction pattern, effect of moisture stress on crop growth.	**2**
5	Methods of soil moisture estimation, evapotranspiration and crop water requirement	**1**
6	Effective rainfall, different approaches of scheduling of irrigation, methods of irrigation and economic use of irrigation water	**2**
7	Layout of different irrigation systems, irrigation efficiency and water use efficiency, conjunctive use of water, irrigation water quality and its management	**2**
8	Water management of different crops (rice, wheat, maize, groundnut, sugarcane, mango, banana and tomato)	**2**
9	Quality of irrigation water and irrigation management practices for different soils and crops	**1**
10	Layout of underground pipeline system, Irrigation automation, Artificial Intelligence and climate-based irrigation practices and its management.	**1**
	Total	**14**

Practical Content:

Unit	**Topics**	**Contact Hours**
1	Determination of bulk density and soil moisture by various methods	**2**
2	Determination of field capacity by field method and determination of permanent wilting point	**2**
3	Measurement of irrigation water by using water measuring devices viz., flumes, weirs, notches, orifices	**2**

4	Calculation of irrigation water requirement (Problems)	**2**
5	Demonstration of furrow, check basin and basin method of irrigation	**2**
6	Visit to farmers' field and cost estimation of drip irrigation system	**2**
7	Demonstration of filter cleaning, fertigation, injection and flushing of laterals	**2**
8	layout for different methods of irrigation, Erection and operation of sprinkler irrigation system	**2**
9	Measurement of emitter discharge rate, wetted diameter and calculation of emitter discharge variability	**2**
10	Visit to irrigation research centre/ station and visit to command area	**2**
	Total	**20**

Reference Books:

- Rao, Y.P. and Bhaskar, S.R. Irrigation technology. Theory and practice. Agrotech publishing Academy, Udaipur.
- Dilipkumar Mujmdar. Irrigation water management: Principles and Practices. Prentice Hall of India Pvt. Ltd.
- S.V. Patil &Rajakumar, G. R., Water Management in Agriculture and Horticultural Crops. Satish serial publishing House, Delhi.
- Carr M. K. V. and Elias Fereres. Advances in Irrigation Agronomy. Cambridge University Press.

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process.

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
25%	25%	20%	10%	10%	10%

Instructional Method:

1. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by white board may also use any of tools such as demonstration, role play, quiz, brain storming, MOOCs etc.
2. The internal evaluation will be done on the basis of continuous evaluation of students in the class-rooms.
3. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory/ field.
4. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.