BACHELORS WITH WATER MANAGEMENT AS MAJOR (CT – II)
5th SEMESTER
WMG522J2 WATER MANAGEMENT _ WATER MANAGEMENT IN AGRICULTURE

CREDITS: THEORY: 4, INTERNSHIP / PRACTICAL: 2

COURSE OUTCOME:
Students will get insights and develop a comprehensive understanding of irrigation systems, water management principles, and their significance in agricultural practices.

UNIT I: IRRIGATION SYSTEMS
Historical overview of irrigation methods, Types of irrigation methods (surface irrigation, sprinkler irrigation, drip irrigation, Micro-irrigation, Centre pivot, Irrigation by lateral move, Lawn sprinkler systems, Hose-end sprinklers). Types of irrigation systems (Well and Tube Well, Canal, Tank, other types). Design and operation of irrigation systems., Efficiency and effectiveness of different irrigation methods.

UNIT II: IRRIGATION SCHEDULING
Techniques and methods for scheduling irrigation (Time-based, Soil moisture-based). Factors influencing irrigation scheduling (soil moisture, climate, crop growth stage, etc.). Importance of proper timing in irrigation., Principles of water budgeting for irrigation., Decision support tools for scheduling., Net irrigation application depth.

UNIT III: CROP WATER REQUIREMENTS
Crop water needs and Evapotranspiration., Evapotranspiration methods (Pan Evaporation, Blaney-Criddle Method)., Factors influencing crop water needs (Sunshine, temperature, humidity, windspeed)., Water requirements for different crops., Soil characteristics and their influence on irrigation., Effects of water stress oncrop growth and yield., Strategies for managing water stress in different crops.

UNIT IV: WATER MANAGEMENT TECHNIQUES
Water conservation practices in irrigation (Rainwater Harvesting, Irrigation Scheduling, Region-based Produce, cover cropping, mulching, conservation tillage, Use of AgTech Solutions)., Techniques for improving water use efficiency (Optimize Leaf Area, Improvethe Rhizosphere and Root Dynamics, Optimizing Irrigation)., Managing water quality in irrigation systems., Sustainable irrigation practices., Legal and institutional frameworks for water allocation., Alternative methods of plant production (Hydroponics and aquaponics) systems.

INTERNSHIP OR PRACTICAL (2 CREDITS)
1. Determination of Net irrigation application depth.
2. Estimation of evaporation by Pan Evaporation transpiration method (Epan).
3. Assessment of Irrigation Scheduling for a particular crop.
4. Estimation of Discharge of canal or river.
5. Prepare a layout of surface methods of irrigation
6. Soil moisture measurement by gravimetric and volumetric methods
7. Visit to micro irrigation system unit
8. Water management practices in different crops

SUGGESTED READINGS:

1. Sultan, M. and Faiz, A. (2023). Irrigation and Drainage - Recent Advances. Intechopen.
2. Dastane, N. G. (1974). Effective rainfall in irrigated agriculture. FAO Roam.
3. Michael, A.M. (2008). Irrigation Theory and Practice. Vikas Publishing House Pvt Ltd. New Delhi.
4. Murty, V.V.N. (2002). Land and Water Management Engineering (Fourth Edition). Kalyani Publisher, New Delhi.
5. Mbava N., Mutema M., Zengeni R., et al. (2020). Factors affecting crop water use efficiency: a worldwide meta-analysis. Agricultural Water Management, 228, p. art. 105878 *11 p.+. ISSN 0378-3774.

INTERNET REFERENCES
1. http://www.angrau.ac.in/media/7380/agro201.pdf
2. http://gilley.tamu.edu/BAEN464/Handout%20Items/Cuenca%20Book%20Chapter%2 03%20Soil%20Physics.pdf
3. http://ilri.org/InfoServ/Webpub/fulldocs/IWMI_IPMSmodules/Module_3.pdf
4. ftp://ftp.wcc.nrcs.usda.gov/wntsc/waterMgt/irrigation/NEH15/ch1.pdf
5. http://web.ead.anl.gov/resrad/datacoll/conuct.htm
6. http://www.fao.org/docrep/r4082e/r4082e03.htm
7. ftp://ftp.wcc.nrcs.usda.gov/wntsc/waterMgt/irrigation/NEH15/ch1.pdf
8. http://storm.okstate.edu/bae3313/Lecture/8)%20soil- waterplant%20relationships/soil-water-plant%20relationships.pdf
9. http://www.angrau.ac.in/media/7380/agro201.pdf

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