AMITY UNIVERSITY
UTTAR PRADESH

Course Title: WATER RESOURCES ENGINEERING

Credit Units:03

Course Level: UG

Course Code: CEE307

L	T	P/S	SW/FW	TOTAL CREDIT UNITS
03	-	-	-	03

Course Objectives: This course deals with various concepts of water resources engineering. The course introduces the concept of hydrology, ground water and then deals with irrigation engineering. It also deals with design of dam.

Pre-requisites:NIL

Course Contents/Syllabus:

	Weightage (%)
Module I	**25**
Hydrology Hydrologic cycle- Precipitation, rainfall variations, measurement, presentation of RF data, Mean precipitation, Abstractions from precipitation- Runoff-Long term runoff, empirical formulae, short term runoff- hydrograph analysis. Flood-Rational and Empirical methods for prediction - Design floods. Ground water- Aquifer types-flow of ground water – Well hydraulics-Types of wells-Other sources of ground water.	
Module II	**25**
Irrigation Necessity of irrigation and type of irrigation systems.-Total planning concept-Water requirements of crops-Command area-duty-delta. Consumptive use of water –Irrigation efficiency-Irrigation requirement of crops- Classification of canals, Canal alignment, Considerations for fixing longitudinal slope, Typical canal cross sections in embankment and filling, Cross sections of irrigation canals as per BIS codes, Maintenance of canals, Canals in alluvial soils – Regime Theory - Kennedy's and Lacey's Theories, Silting in canals, Scour and protection against scour. Canal lining - losses in irrigation canals, Advantages and disadvantages of lining, Types of lining. Water logging- Causes & preventive measures. Drainage – Open and Closed Drains, components of distribution system.	
Module III	**25**
Reservoir planning Types of developments: Storage and diversion works. Purpose: Single and multi-Reservoir Planning, investigation for locating a reservoir, Selection of site, estimation of required storage, mass curves, reservoir sedimentation, flood routing, height of dam, reservoir operation, economics of reservoir planning, Benefit-Cost ratio, application of optimization techniques, system approach	
Module IV	**25**

Headworks and canal structures Regulation and control of canal system-Purpose, Types of canal regulation works and their functional aspects. Irrigation Outlets-Requirements, types, non-modular, semi-module and rigid module, selection criterion. River Training - Objective and need, classification of rivers, and river training works, meandering, stages, methods of river training, bank protection, Weirs on permeable foundation	

Student Learning Outcomes:

1. An understanding of hydrology and its application in varied areas of civil engineering
2. An exposure to irrigation engineering and understanding of calculating water requirement for canal design
3. An understanding of reservoir planning and calculation of its B-C ratio
4. An understanding of canal structures, planning and design
5. An ability to apply the learning in further research work in related areas

Pedagogy for Course Delivery:

1. Class room teaching supported with presentation for enabling better understanding of the subject.
2. Application oriented assignments.
3. Class room lectures will be supplemented with field related examples.

Assessment/ Examination Scheme:

Theory L/T (%)	**Lab/Practical/Studio (%)**	**TOTAL**
100	**0**	**100**

Theory Assessment (L&T):

Continuous Assessment/Internal Assessment					**End Term Examination**
Components (Drop down)	**Class test**	**Home assignment**	**Viva**	**Attendance**	**Exam**
Weightage (%)	10	7	8	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Text & References:

- Irrigation Engg. and Hydraulic Structures by S.K. Garg, Khanna Publishers.
- Irrigation, Water Resources, and Water power Engineering By Dr P.N.Modi, Standard Book House 1990
- Engineering Hydrology by K. Subramanya, TMH.
- Irrigation Water Power and Water Resource Engg. by K.R. Arrora.
- Water Resources Engg. By Larry W. Mays, John Wiley India
- Water resources Engg. By Wurbs and James, John wiley India
- Water Resources Engg. By R. K. Linsley, McGraw Hill
- Irrigation and water Resources Engg. By G L Asawa, New age International Publishers
- Irrigation Theory and practices by A.M. Michel.
  Irrigation and water Power engineering by B.C. Punmia, Laxmi Publications.