LESSON PLAN FOR HYDRAULIC AND IRRIGATION ENGINEERING

Discipline Civil	**Semester: 4th**	**Name of teaching faculty:** ***Sourav Kumar Behera***
Subject: Hydraylic& Irrigation Engg.	**Nos of days per week class allotted: 5**	**Semester from date:9.12.19 to date: 31.03.20**
Week	***Class day***	***Theory topics***
DEC 2ND Week	**1ST**	**HYDROSTATICS**: Introduction
	2ND	**Properties of fluid**:density, specific gravity, surface tension,
	3RD	capillarity, viscosity and their uses
	4th	**Pressure and its measurements**: intensity of pressure, atmospheric pressure
	5th	gauge pressure
DEC 3rd Week	**1ST**	, absolute pressure and vacuum
	2	pressure relationship between atmospheric pressure, absolute pressure and gauge pressure
	3	pressure head; pressure gauges
	4	**Pressure exerted on an immersed surface**: Total pressure, resultant pressure
	5	pressure head; pressure gauges expression for total pressure exerted on horizontal & vertical surface
DEC 4th week	**1**	Problems
	2	Problems
January 1st week	**1ST**	**KINEMATICS OF FLUID FLOW** Basic equation of fluid flow and their application: Rate of discharge
	2ND	equation of continuity of liquid flow,
January	**1ST**	total energy of a liquid in motion- potential,

2ND week		kinetic & pressure
	2ND	Bernoulli's theorem and its limitations
	3RD	Practical applications of Bernoulli's equation
	4TH	Flow over Notches and Weirs Notches, Weirs
	5TH	types of notches and weirs
January 3rd week	**1ST**	Discharge through different types of notches and weirs
	2ND	their application
	3RD	Types of flow through the pipes uniform and non uniform; laminar and turbulent; steady and unsteady
	4TH	Reynold's number and its application
	5TH	Losses of head of a liquid flowing through pipes Different types of major and minor losses.
January 4th week	**1ST**	Simple numerical problems on losses due to friction using Darcy's equation
	2ND	Total energy lines & hydraulic gradient lines (Concept Only).
	3RD	Flow through the Open Channels Types of channel sections-rectangular, trapezoidal and circular
January 5th week	**1ST**	discharge formulae- Chezy's and Manning's equation
	2ND	Best economical section
	3RD	Problems
February 2nd week	**1st**	**PUMPS** Type of pumps
	2nd	Centrifugal pump: basic principles, operation, discharge
	3rd	horse power & efficiency.
	4th	Reciprocating pumps: types, operation, discharge
	5th	horse power & efficiency
February 3rd week	**1st**	**Hydrology** Hydrology Cycle

	2nd	Rainfall: types, intensity, hyetograph
	3rd	Estimation of rainfall, rain gauges, Its types
	4th	Concept of catchment area, types, run-off, estimation of flood discharge by Dicken's and Ryve's formulae
	5th	**Water Requirement of Crops** Definition of irrigation, necessity, benefits of irrigation, types of irrigation Crop season
February 4th week	1st	Duty, Delta and base period their relationship, overlap allowance, kharif and rabi crops
	2nd	Gross command area, culturable command area, Intensity of Irrigation, irrigable area, time factor, crop ratio
	3rd	**FLOW IRRIGATION** Canal irrigation, types of canals, loss of water in canals
	4th	Perennial irrigation
	5th	Different components of irrigation canals and their functions
February 5th week	1st	Sketches of different canal cross-sections
	2nd	Classification of canals according to their alignment, Various types of canal lining – Advantages and disadvantages
	3rd	Problems
	4th	**WATER LOGGING AND DRAINAGE** Causes and effects of water logging
	5th	detection, prevention and remedies
March 1st week	1st	**DIVERSION HEAD WORKS AND REGULATORY STRUCTURES** Necessityof diversion head works, weirs and barrages
	2nd	objectives of diversion head works, weirs and

		barrages
	3rd	General layoutof barrage
March 2nd week	1st	functions of different parts of barrage
	2nd	Silting and scouring
March 3rd week	1st	Functions of regulatory structures
	2nd	**CROSS DRAINAGE WORKS** Functions and necessity of Cross drainage works
	3rd	aqueduct, siphon
	4th	super-passage, level crossing
	5th	Concept of each with help of neat sketch
March 4th week	1st	**DAMS** Necessity of storage reservoirs
	2nd	types of dams
	3rd	Earthen dams: types, description
	4th	causes of failure and protection measures
	5th	Gravity dam- types, description,
Mach 5th week	1st	Causes of failure and protection measures
	2nd	Spillways- Types (With Sketch) and necessity