No.	Information on Hydraulic Engineering & Applied Hydraulics I	
1.	Unit Name: Hydraulic Engineering & Applied Hydraulics I	
2.	Code: CE- 41016	
3.	Classification: Engineering Subject	
4.	Credit Hour: 3	
5.	Semester and Year Taught: 1/4	
6.	Pre- requisite (if any):CE-31016 &CE- 32016	
7.	Method of Delivery: Lecture, Tutorial & practical	
8.	Assessment System and Breakdown of Marks	
	Tutorial	10%
	Practical	15 %
	Practical Exam	5%
	Final Examination	70%
	Total	100%
9.	Teaching Staff	
10.	Objective of Unit:

The main aim of this subject is to understand the classification of open channel flow, geometric element of channel section, velocity and pressure distribution, critical flow, channel transition and local phenomena, uniform flow and its formula, stable hydraulic section, Show that the theoretical discharge, the critical state of flow, relationship between initial depth and sequent depth and best hydraulic section, apply energy equation, energy and momentum principle, and the best hydraulic section criteria and compute critical flow, hydraulic jump, uniform flow, chezy resistance factor, composite roughness and the channel section | |
| 11. | Learning Outcome of Unit

At the end of the unit, a student shall be able to:

1. Describe and explain the classification of open channel flow, geometric element of channel section, velocity and pressure distribution, critical flow, channel transition and local phenomena, uniform flow and its formula, stable hydraulic section, and Show that the theoretical discharge, the critical state of flow, relationship between initial depth and sequent depth and best hydraulic section

2. Apply energy equation, energy and momentum principle, and the best hydraulic section criteria and compute critical flow, hydraulic jump, uniform flow, chezy resistance factor, composite roughness and the channel section | |
| 12. | Synopsis

The unit intended to understand to understand the classification of open channel flow, geometric element of channel section, velocity and pressure distribution, critical flow, | |

	channel transition and local phenomena, uniform flow and its formula, stable hydraulic section, Show that the theoretical discharge, the critical state of flow, relationship between initial depth and sequent depth and best hydraulic section, apply energy equation, energy and momentum principle, and the best hydraulic section criterion and compute critical flow, hydraulic jump, uniform flow, chezy resistance factor, composite roughness and the channel section

13.	**Topics 1. Open – channel and its classification**
	
	    Open channel Flow, Comparison between pipe flow and open channel flow, Type of flow, State of flow, Regimes of flow
	
	 Topics 2. Open – channels and their properties
	
	    Channel geometry, Velocity distribution, Pressure distribution of in a channel section
	
	Topics 3. Energy and Momentum Principles
	    Energy in open- channel flow, specific Energy, Criterion for a critical state of flow, Interpretation of local phenomena, channel transition, momentum in open channel flow, Specific force
	
	Topics 4. Critical Flow: its computation and applications
	    Critical flow, section factor for critical flow computation, hydraulic exponent for critical flow computation, computation of critical flow, flow measurement
	
	Topics 5. Development of uniform flow and its formulas
	    Qualification for uniform flow, establishment of uniform flow, expressing the velocity of the uniform flow, the chezy formula, determination of chezy resistance factor, manning formula, determination of manning roughness coefficient, factors affecting manning roughness coefficient, table of manning roughness coefficient ,illustration of channel with various roughnesses
	
	Topics 6.Computation of uniform flow
	    The conveyance of channel section, section for uniform flow computation, hydraulic exponent for uniform flow computation, flow in a channel section with

	composite roughness, determination of normal depth, velocity, normal and critical slopes **Topics 7. Design of channels for uniform flow** Best hydraulic section, stable hydraulic section
14.	Main References: 1. **Text Book, Open-Channel Hydraulics, VEN TE CHOW, International Student Edition**

Information on Lab Practical (CE-41016 Hydraulic Engineering & Applied Hydraulics I)

Lab	Activity
P$_1$	Topic: Friction Resistance in Sand Bed Task: To investigate flow resistance in a sand bed Resources: Sediment Transport channel, clean Sand ,overshot weir and point gauge
P$_2$	Topic: Critical Depth Task: To determine the relationship between the specific energy and upstream head for water flowing under an undershot weir. Resources: Sediment Transport channel, overshot weir and point gauge
P$_3$	Topic: Hydraulic Jump Task: To investigate the characteristics of a standing wave (the hydraulic jump) produced when water flows beneath an undershot weir and to observe the flow patterns obtained. Resources: Sediment Transport channel, overshot weir and point gauge