



# THE FEDERAL UNIVERSITY OF TECHNOLOGY, AKURE

## Department of Civil Engineering

### CVE 512 – Design of Hydraulic Structures

#### COURSE PARTICULARS

**Course Code:** CVE 512

**Course Title:** Design of Hydraulic Structures

**No. of Units:** 3

**Course Duration:** Two hours of Lectures and three hours of practicals per week for 12 weeks

**Status:** Elective

**Course Email Address:** okolics 2002@gmail.com

**Course Webpage:** [http://www.cve.futa.edu.ng/course schedule.php?coursecode=512](http://www.cve.futa.edu.ng/course%20schedule.php?coursecode=512)

**Prerequisite:** Nil

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#### COURSE DESCRIPTION

Hydraulic structures can be defined as structures that have contact or relationship with hydraulic materials in nature, such as water, oil, gas and hydrocarbon. These structures are normally affected by the nature of materials they come in contact with either as imposed, superimposed or resistive loads. The nature of these interaction introduces the multiple or auxiliary forces which tend to create structural instability. These forces which add additional loadings makes these structures to become somehow difficult to analyse the course hydraulic structure is a hybrid of hydraulics and structures therefore, is set to identify these type of structures and to prescribe safe method of analysis and design. Research have, however, shown that hydraulic structures are heavy structures and is beginning to constitute 80% of the structures encountered in nature.

#### COURSE OBJECTIVES

The objectives of this course are to:

- Introduce the student to fundamentals of design of hydraulic structures in civil engineering.
- Demonstrate to the student the use of various technique used in the design civil engineering structures.
- Demonstrate the use, of hydraulic structures code BS5440 being used in design of hydraulic structures.

Upon successful completion of this course, the student will be able to: *(Knowledge based)*

- Analyse and design hydraulic structures using relevant code of practice.
- Apply the basic design principles to engineering design practice.
- Undertake design and detailing of civil engineering works.

## GRADING SYSTEM FOR THE COURSE

Grading system for the course will be as follows:

Assignments, tests drawing and detailing studio	40%
Final Examination	60%
<b>TOTAL</b>	<b>100%</b>

## GENERAL INSTRUCTIONS

*Attendance:* The student is required to attend all lectures and participate in all studio classes.

## READING LIST

BS 8110 code of practice

BS 5440 code for water concrete structures

## COURSE OUTLINE

Week	Topic	Remarks
1	Design of channels using BS5440 BS8110	The student should be made to design different types of hydraulic flow channels using the appropriate code of practice
2	Design of Dams of different sizes and materials	The student should be taught how to design different types of dams and of different materials
3	Design of spill ways and weirs	The student should be able to design a hydraulic spill way structures for different dams
4	Design of Retaining walls using BS5440 and BS8110	The student should be exposed to the techniques of design of retaining walls of various sizes
5	Design of culverts using BS5440 and BS8110	The student should be able to design and detail different types of culverts
6	Design of Bridges using BS5440 and BS110	The student should be able to design and detail different type of bridges and bridge component
7	Design of underground tunnels and Bunker using BS8110 code	Design of underground railway tunnels, military bunkers will be taught to the student using BS8110 code of practice.

8	Design of swimming pool of various sizes using BS 5440 code of practice	The student should be taught how to use the BS 5440 code of practice to design swimming pools of various sizes
9	Design of underground military storage dump for nuclear and chemical weapons	The student should be exposed on how to design underground nuclear or chemical weapon storage facility
10	Design of pressure vessels and gunboat	The student should be taught on how to design pressure vessels such as submarine and gunboats etc.