College Code: QA

BRILLIANT INSTITUTE OF ENGINEERING & TECHNOLOGY

(Approved by AICTE, New Delhi, Affiliated to JNTU-Hyderabad)
Abdullapur(V), Abdullapurmet (M), R.R. Dt. Hyderabad - 501505
Website: www.b-iet.ac.in, e-mail: principal@b-iet.ac.in

DEPARTMENT OF CIVIL ENGINEERING

Academic Year 2021 – 22

Course	**Irrigation and Hydraulic Structures**	Year / Semester	**IV / I**
Topic	**Design principles of weirs on permeable Foundations using Creep theories**	Innovative Method Chosen	**Problem Based Learning**

Problem Based Learning:

Problem-based learning is a teaching method in which students learn concepts by working on a real-world or practical problem. It encourages students to identify the problem, collect relevant information, analyze possible solutions, and apply their knowledge to solve it. Students usually work individually or in groups, while the teacher acts as a facilitator and guides them throughout the learning process. This approach develops problem-solving skills, critical thinking, teamwork, decision-making, and the ability to apply theoretical knowledge to practical situations.

Objectives:

3. To engage students in identifying, analyzing, and solving real-world problems, and as an aid to applying theoretical knowledge, making decisions, and developing practical solutions.
4. To help students develop critical and creative thinking, improve their problem-solving ability, and enhance teamwork and decision-making skills at the same time.

Outcomes:

3. The learning ability of students will get enhanced by encouraging them to apply theoretical knowledge to real-world problems through active learning and practical activities.
4. Problem-solving, critical thinking, teamwork, and decision-making abilities of students will get improved.

Justification:

Problem-based learning is an active learning approach that helps students understand concepts by solving real-world and practical problems. It is a technique that promotes critical thinking and practical application, so this practice will help students connect theoretical knowledge with practical situations and develop effective problem-solving skills.

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Details of the Implementation:

- Faculty explained the concept of Design Principles of Weirs on Permeable Foundations Using Creep Theories and its practical applications.
- Based on the discussion, the teacher presented a practical problem related to the design of a weir on a permeable foundation and asked the students to identify and solve the problem within 15 minutes.
- Each student analyzed the given problem and proposed a suitable design by considering the hydraulic head, creep length, seepage conditions, Bligh's creep theory, Lane's weighted creep theory, and safety against piping and uplift pressure.

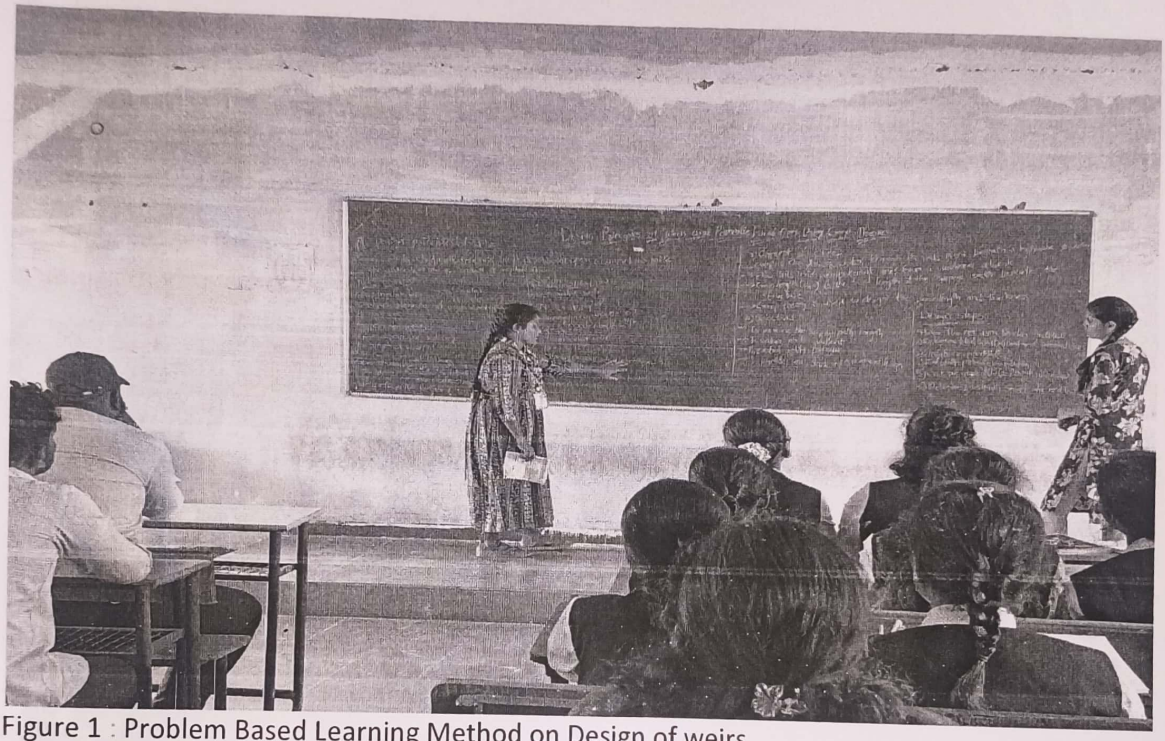


Figure 1 : Problem Based Learning Method on Design of weirs

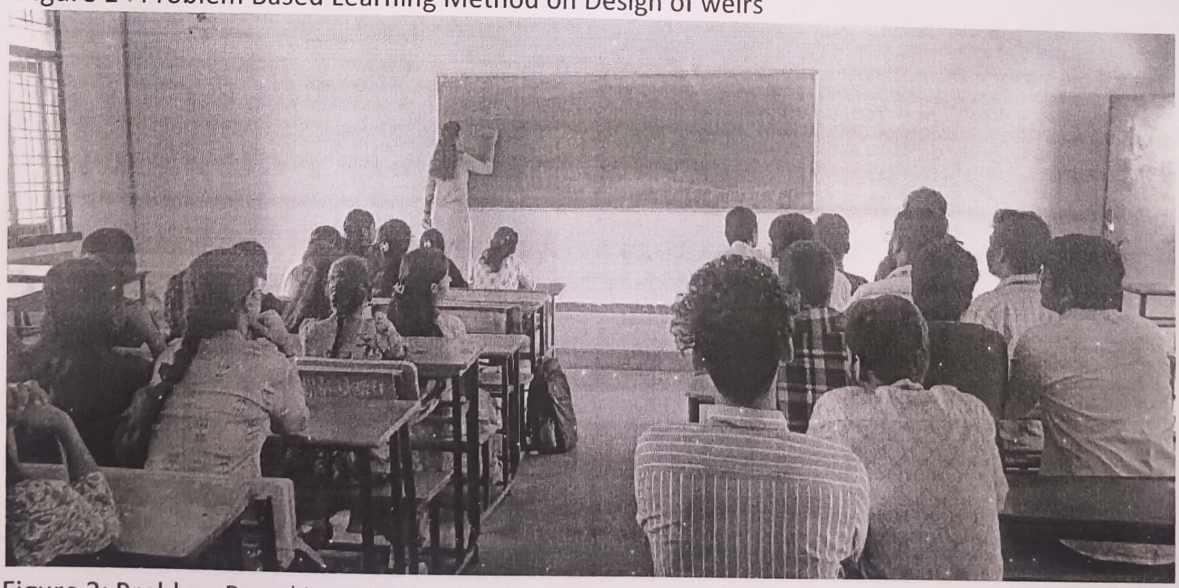


Figure 2: Problem Based Learning

Coordinator

Head of the Department

Head of the Department
Department of Civil Engineering
Brilliant Institute of Engineering & Technology
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DEPARTMENT OF CIVIL ENGINEERING

Date: 09-12-2021

To
The Principal,
Brilliant Institute of Engineering and Technology,
Abdullapur (V & M) – 501505,
R. R. District, Hyderabad.

Respected Sir,

Sub: Seeking Permission – Innovative TLP – Req. – Reg.

We are hereby bringing to your kind notice that the Department of Civil Engineering is going to conduct an innovative teaching-learning session, i.e., Problem-Based Learning (PBL), for our students. Problem-Based Learning is a student-centered teaching methodology in which students are provided with a practical engineering problem and encouraged to analyze the problem, discuss possible solutions, apply theoretical concepts, and present their findings.

We have scheduled the program on 27-12-2021 at 9:15 am to 10:55 am for the IV - I Semester students. The topic selected for the session is "Design Principles of weirs on permeable foundations using creep theories" The activity will provide students with an opportunity to apply their theoretical knowledge to a practical structural engineering problem and develop their problem-solving, analytical, teamwork, design, and communication skills.

This will be a good knowledge-sharing and learning platform for the students and will enhance their active participation in the teaching-learning process.

In this regard, we kindly request you to grant permission to conduct the Problem-Based Learning activity for the students.

Thanking you, Sir.

Yours Sincerely,

Head of the Department

Head of the Department
Department of Civil Engineering
Brilliant Institute of Engineering & Technology
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DEPARTMENT OF CIVIL ENGINEERING

Date: 24-12-2021

Circular

This is to inform faculty members and students of the Department of Civil Engineering that the department is going to conduct a Problem-Based Learning (PBL) activity involving faculty along with students on the topic "Design Principles of weirs on permeable foundations using creep theories" on 27-12-2021 at 9:15 am to 10:55 am. This will be a good knowledge-sharing and problem-solving platform for students to analyze practical engineering problems, discuss ideas, develop suitable solutions, and apply their theoretical knowledge through collaborative learning.

Hence, all the students of IV- I Semester and students who are interested to participate are directed to enroll their names with the concerned faculty on or before 26-12-2021.

Head of the Department

Head of the Departme
Department of Civil Engineering
Brilliant Institute of Engineering & Technolog
Abdullapur (V), R.R. Dist., Hyderabad-501505

Copy to:
Circulate in all Civil classrooms.
Display in the all notice boards
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DEPARTMENT OF CIVIL ENGINEERING

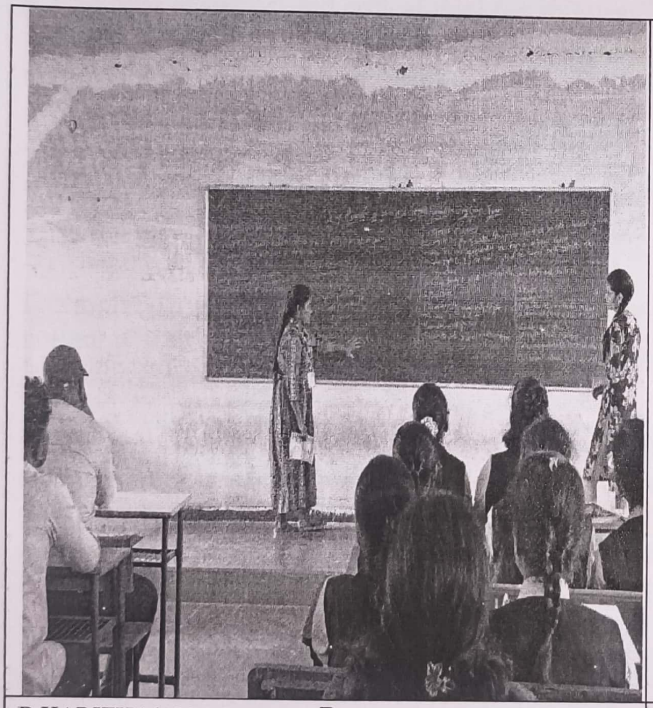
Problem Based Learning :

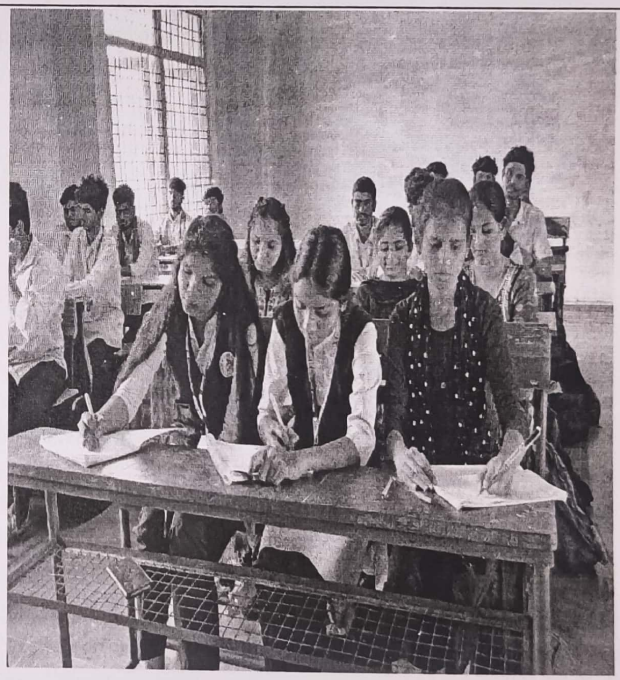
Problem-Based Learning (PBL) is a modern teaching method where students learn by solving a practical or real-world engineering problem.

Explanation: In a normal classroom, the faculty explains the concepts and students mainly learn through lectures and exercises.

In Problem-Based Learning, students are given an engineering problem first. They analyze the problem, discuss possible solutions, apply their theoretical knowledge, perform calculations, and develop a suitable solution with guidance from the faculty.

The method encourages students to share ideas, work collaboratively, think critically, and solve engineering problems creatively.





B.HARITHA(19QA5A0106), B. MADHAVI(19QA5A0108) | Students solving problems IHS

It Works

- **Problem Identification:** Students are given a practical in Irrigation and Hydraulic Structures problem involving the design principles of weirs on permeable foundations using creep theories.
- **Group Formation:** Students work in small groups and discuss the given problem.

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DEPARTMENT OF CIVIL ENGINEERING

- **Problem Analysis:** Students identify the given data, hydraulic conditions, dimensions of the weir, foundation characteristics, seepage conditions, and appropriate methods of creep theory analysis.
- **Application of Knowledge:** Students apply concepts such as seepage, uplift pressure, hydraulic gradient, creep length, exit gradient, and stability of weirs on permeable foundations.
- **Solution Development:** Students determine the required creep length, seepage characteristics, uplift pressure, and hydraulic conditions, and perform the necessary calculations for the design of the weir using appropriate creep theories.
- **Faculty Guidance:** The faculty guides clarifies doubts, and provides suggestions the students, whenever required.
- **Presentation:** Each group presents its design procedure, creep length calculations, seepage analysis, uplift pressure calculations, and final design solution for the weir on a permeable foundation.
- Students develop problem-solving skills.
- Improves analytical and critical-thinking abilities.
- Helps students connect theoretical knowledge with practical engineering applications.
- Encourages teamwork and collaborative learning.
- Improves design and decision-making skills.
- Develops communication and presentation skills.
- Promotes active participation and independent learning.

Example: Irrigation and Hydraulic Structures faculty gives students a problem to study and design a weir on a permeable foundation using appropriate creep theories under specified hydraulic conditions.

Students work in groups to identify the hydraulic conditions, water depths, foundation characteristics, seepage conditions, and design requirements, calculate the required creep length, seepage characteristics, uplift pressure, and exit gradient, and determine the critical design parameters. Finally, each group presents its solution and explains the design procedure and application of creep theories to the class.

Coordinator

Head of the Department

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DEPARTMENT OF CIVIL ENGINEERING

Summary Report

On

Flipped class room

The Department of Civil Engineering conducted a Problem-Based Learning (PBL) session on the topic " Design Principles of weirs on permeable foundations using creep theories" The main objective of this activity was to enhance the problem-solving skills, analytical skills, technical knowledge, and design abilities of students. The activity also helped students develop confidence in analyzing structural problems and presenting their solutions.

The event was organized in the form of a group-based problem-solving activity on the analysis and design of Design Principles of weirs on permeable foundations using creep theories and their engineering applications. The session encouraged active participation, collaborative learning, and application of theoretical concepts to practical structural engineering problems. The activity was mapped to Program Outcomes (PO1, PO2, PO3,PO5, PO10), focusing on engineering knowledge, problem analysis, and design/development of solutions.

A large number of students actively participated in the activity and worked in groups to analyze the given hydraulic engineering problem. Students identified the hydraulic conditions, foundation characteristics, seepage conditions, and design requirements; calculated the creep length, seepage characteristics, uplift pressure, and exit gradient; and determined the critical design parameters. Each group presented its solution and explained the design procedure and application of creep theories **to** the class.

On this occasion, **Dr. Shaik Rusthum, Principal**, motivated the students to participate actively in such academic activities and appreciated their enthusiasm. He congratulated the organizing committee for successfully conducting the activity and advised the faculty members to organize more interactive and innovative learning activities to develop problem-solving abilities, leadership qualities, teamwork, and technical competence among students.

The program concluded successfully with positive feedback from both students and faculty members. The Problem-Based Learning approach proved to be an effective method for improving student engagement, collaborative learning, analytical thinking, and conceptual understanding of structural analysis and design.

The competitive spirit among the students. The total number of students participated 24

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DEPARTMENT OF CIVIL ENGINEERING

Winner Notification

S.NO	Roll Number	Name Of The Student
1	19QA5A0106	B. HARITHA
2	19QA5A0108	B. MADHAVI
3	19QA5A0153	P. HARIKRISHNA
4	19QA5A0133	K. AKASH

Coordinator

Head of the Department

Head of the Department
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