



EASWARI ENGINEERING COLLEGE



(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

Innovation by Faculties in Teaching - Learning

Sl No	Subject Name	Faculty Name	Innovation in Teaching Initiatives	Outcomes
1.	191GES202T-Engg.Mechanics	Dr.R.Gopalakrishnan	Demonstration through Model (A model prepared using Pencils)	After demonstration through modeling, students got a better understanding of the concepts of Friction, Center of gravity and load distribution and also learned lami's theorem.
2.	CE8703-STRUCTURAL DESIGN AND DRAWING	Dr.G.Senthil Kumar	INNOVATIVE TEACHING METHOD- GRAPHICS TABLET was used for the subject of STRUCTURAL DESIGN AND DRAWING A graphic tablet is really helpful in opening new dimensions to teachers as well as students. Designed with all	Students are able to follow the design and drawing during the online class in easy manner It experience the black board effect and they can easily follow both video and audio. Classes were recorded and uploaded in youtube and Google Class room for further references.

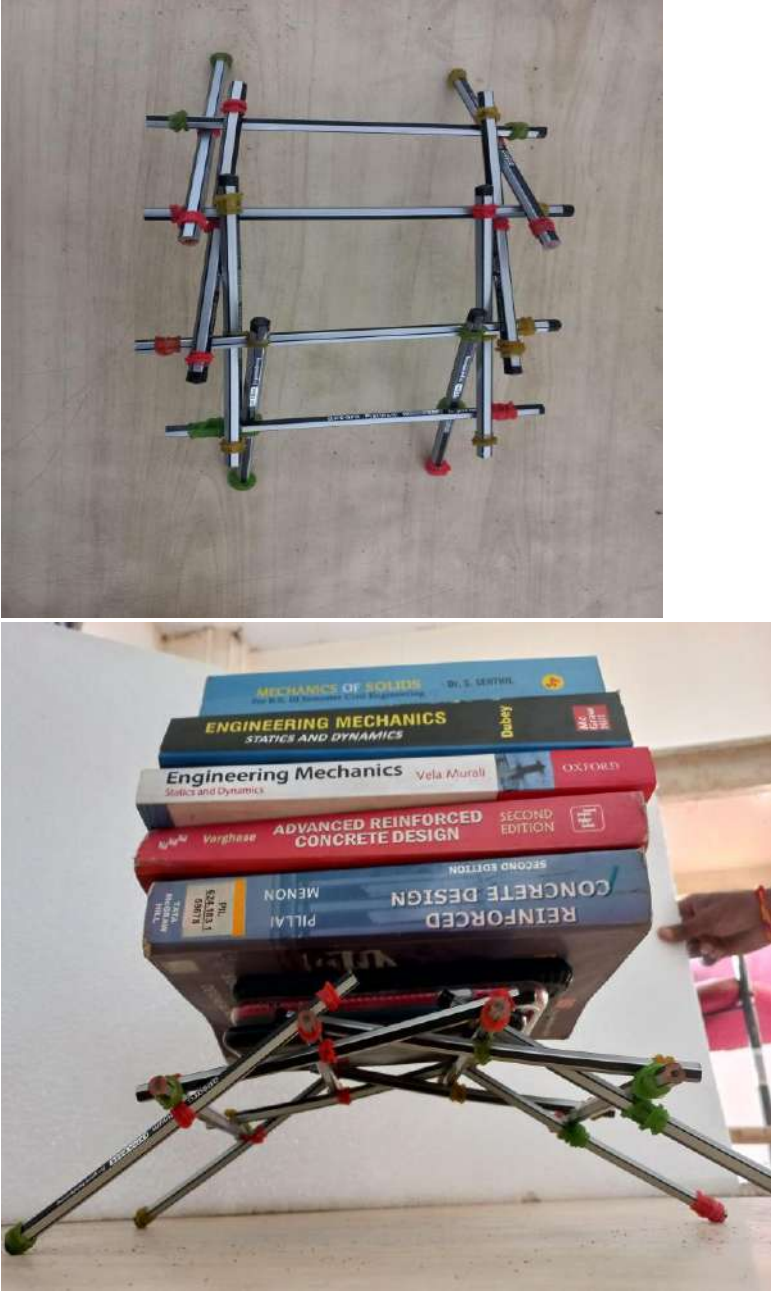
			functions and features, graphic tablets for drawing fulfill all the unique needs of each student..	
3.	191CEC304T Concrete Technology	Dr.G.Velrajku mar	Demonstration through Marsh Cone apparatus Model	<p>1.Students are able to understand tests on optimum percentage of Plasticizer /superplasticizer by marsh cone apparatus.</p> <p>2. To understand the effect of Plasticizer /superplasticizer on concrete.</p> <p>3. To Test with various types/Grades of cement and calculate the proper amount of Plasticizer /superplasticizer.</p>
4		Dr.M.Siva	Demonstration of concepts through Self-made YouTube videos	<p>.Videos were prepared and published in YouTube website</p> <p>https://youtu.be/OD4Nx7KLS4</p> <p>https://youtu.be/XZlger_sUu8</p> <p>https://youtu.be/xH_2twq4so</p> <p>https://youtu.be/4gK6vi2kco</p> <p>. Students were able to build the mathematical modeling for types of vibration and its analyses</p>

5.	Green Building Materials	Dr.M.Naveen Kumar	Model prepared for filtration	<p>Filtration techniques influence the student's to bring sustainable solutions to the environment.</p> <p>Filtration techniques indicate to bring eco-friendly and cost-effective treatment.</p> <p>Student's creativity level has increased by this activity.</p>
6.	CE 8403 APPLIED HYDRAULIC ENGINEERING	Mrs.L.Chandrankanthamma	<p>SKILL LAB DEMO- Live Demo in Skill Lab to understand different Pipes,Pumps and Valves In LEHRY INSTRUMENTATION & VALVES PVT LTD to II Year Students. Different types of pipes ,Pumps and Valves were explained using Simulation</p>	<p>1.Design different pumps.</p> <p>2.Use modern engineering tools and techniques for modeling, analyzing and designing the necessary components.</p> <p>3.100% Pass In CE 8403 Applied Hydraulic Engineering</p>
7.	CE8501 DESIGN OF REINFORCED CEMENT CONCRETE ELEMENTS	Mrs.G.Prabha	<p>DETAILING REINFORCEMENT MODEL prepared by students and explained the concept of detailing for slab,beam,column and footing</p>	<p>1.Able to understand the reinforcement detailing of concrete elements</p> <p>2.Able to do the design of structural elements</p> <p>3. Know about the various diameter of bars used in detailing reinforcement</p>

8.	Estimation Costing and Valuation Engineering	Mr.M.Surendar	3D Rendered Model using a AUTOCADD Software	Able to visualize the sections and elements in a 2D plan
9.	Materials Testing Laboratory	Mrs.M.Amala	Concrete of M30 grade A Python programme was created to determine the mix design of a concrete. Manual mix design was also validated using Python Programming Mix Design of grade M30.	<ol style="list-style-type: none"> 1. Reduces the time consumption for design calculations. 2. Easy to understand. 3. Provides accurate data. 4. Human errors can be checked.
10.	191CEC404T Transportation Engineering	Mr.R.Dinesh Kumar	Virtual Labs (An MHRD Govt. of India initiative) https://ts-nitk.vlabs.ac.in/transportation-engineering/	The main objective of this virtual lab is to conduct all standardized tests to assess the quality of highway materials and pavements
11.	191CEE501T-Irrigation Engineering	Mr.Lenin Dhal	Model of Drip Irrigation system	<p>Students went through the model preparation of drip irrigation system to have practical ideas.</p> <p>The process is helpful for students to understand the effective relationship between water and crops.</p> <p>Water and nutrients are delivered across the</p>

				field in pipes called 'dripperlines' featuring smaller units known as 'drippers'. Each dripper emits drops containing water and fertilizers, resulting in the uniform application of water .
12.	STRUCTURAL ANALYSIS -II	Mr.J.Ajith	Flipped Classroom	After this Flipped classroom strategy , 70% of the students marks were improved in Continuous assessment test 2 compared with Continuous assessment test 1 Students started attending class with the basic information. Students were interactive
13.	SOIL MECHANICS	Mr.A.Mohan	Learning Material Source Implementation.	Most of the students understand the concept clearly by learning the subjects through Learning material source.

Description of the Innovative Teaching Learning

S.No	Developed By Faculty	Description with Photo
1.	Dr.R.Gopalakrishnan	 <p data-bbox="626 1766 1516 1843">Modeling a small bridge with Pencils (Demo for the concepts) for Engineering Mechanics.</p>

		<p>A small bridge type is formed with pencils and rubber bands. This bridge is checked for the load carrying capacity by loading with 5 textbooks on top of it. The bridge does not collapse even after loading 5 books, which is around 4-5 kg, which satisfied the mechanism we followed. We tried for 6 books, it was collapsed.</p> <p>Outcomes of this Model:</p> <p>This small model prepared with pencil and rubber will be helpful in demonstrating the concepts of truss elements, method of joints, equilibrium of forces, friction and Centre of Gravity and load distribution. If all the pencils are not equally distributed, the bridge fails, and the spacing of the pencils should be kept properly for balancing. If we the inclination of the pencil is more, the pencil slides, which explains the concept of friction. Similarly, the pencil does not moving, due to rubber band.</p>
--	--	---

2.

Dr.G.Senthil Kumar

All the online classes have been taught by Graphics tablet. Graphics tablet is the alternate type of input device or in conjunction with the mouse. Whereas, the graphics tablet (Fig. 1) is one of the best online teaching tools for the problematic subject. I.e., CE8703 Structural design and drawing subjects have complete design and drawing of all the units. Hence, during the pandemic time, online class will be more effective and also students will be able to follow the design and respective drawing. Students can experience the black board effect and they can easily follow both video and audio.

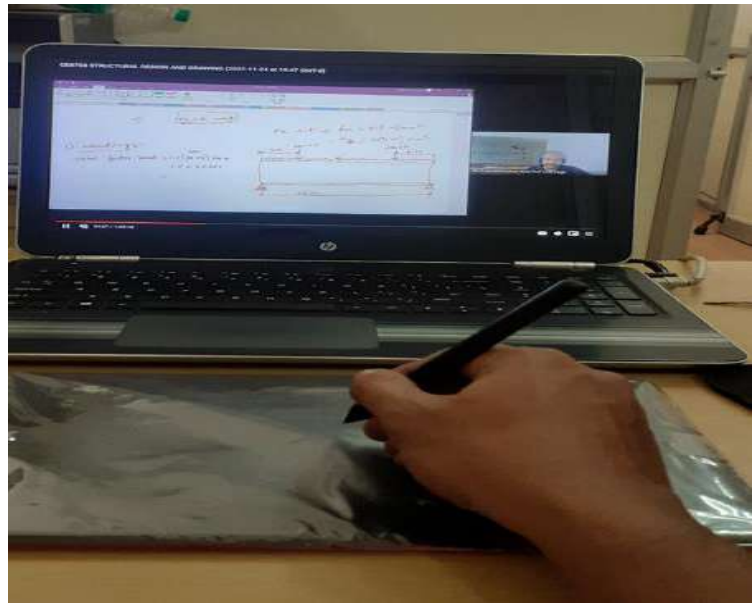


Fig.1. Typical view of using pen Tablet during class

Figure 2 shows the sample picture of step-by-step design procedure and concept explained by using the pen tablet.

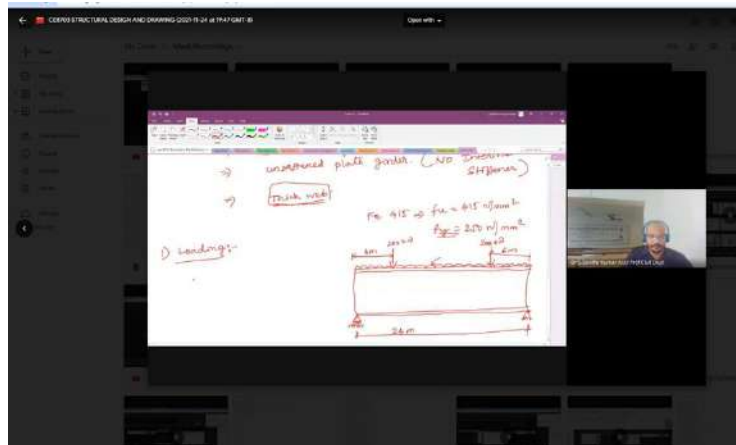


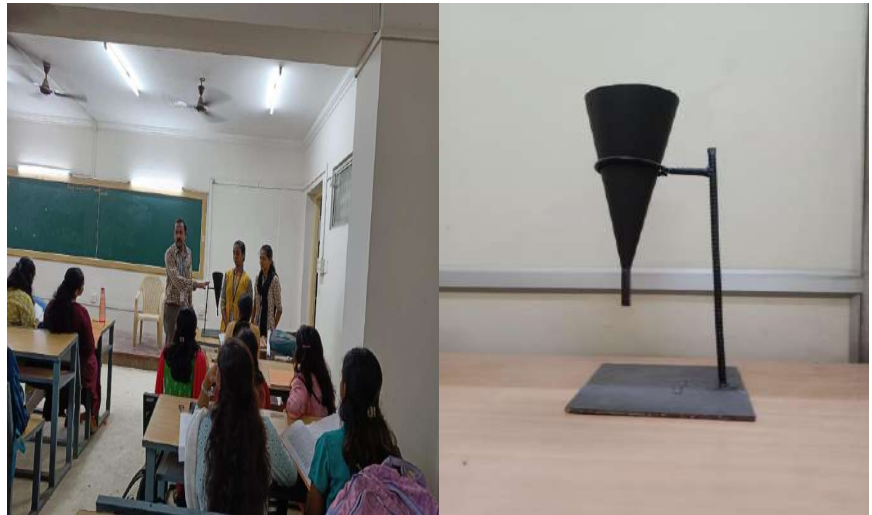
Fig. 2. Output of pen Tablet

This methodology can help the students to increase the concentration level. All the students benefited in the method of teaching.

3.

Dr.G.Velraj Kumar

Marsh cone test is a test for finding the optimum dosage of plasticizers and superplasticizers for different types of cement. To find the amount of plasticizers added to concrete ranges from 0.1 to 0.5 % of the total weight of cement. First, you need to prepare a cement paste of 1L with a desired water-cement ratio by adding 2kg of cement to them. While preparing the cement paste, the mixing should take place in the mortar mixer. The mortar mixer is used to avoid the formation of lump at the bottom of the vessel. You can take water cement ratio ranging from 0.3 to 0.5.7 The 70 percent of water is added at the beginning of mixing in the first step and the remaining water is added in the second step with superplasticizers. The dosage of superplasticizer will be 0.1 percentage of the weight of cement. Take 1L slurry and pour into a marsh cone by closing the aperture with a finger. Start the stop and remove the finger. Note the time taken in seconds for complete flow out of cement paste. This time in seconds is called marsh cone time. Repeat the above steps with different amount of plasticizer with the desired water-cement ratio. The Saturation point is the dose at which marsh cone time is lowest. This dose is the optimum dose of superplasticizer of plasticizer for that brand or type of cement. This model based method can help the students to better understand the effect of admixture . All the students benefited from the method of teaching.



Modern structures are increasingly slender and have reduced redundant strength due to improved analysis and design methods. Such structures are increasingly responsive to the manner in which loading is applied with respect to time and hence the dynamic behaviour of such structures must be allowed for in design; as well as the usual static considerations.

Real-life structures are subjected to loads which vary with time. Except for the self weight of the structure, all other loads vary with time. In many cases, this variation of the load is small, hence static analysis is sufficient.

In case of offshore structures (oil rigs), high rise buildings subjected to lateral loads (wind, earthquake) dynamic effects of the load must be explored for knowing the exact safety and reliability of the structure.

Types of Vibration:

- a) Free vibration
- b) Forced vibration
- c) Damped Free and Forced vibration

Degrees of Freedom: The number of possible displacement components is called as Degree of Freedom (DoF). Hence DOF also represents minimum number of coordinate systems required to denote the position of the mass at any instant of time

Depending upon the co-ordinates to describe the motion, we have

1. Types of Vibrations
2. Single degree of freedom system (SDoF).
3. Two degrees of freedom (MDoF).
4. Solution for the equations of motion.

To understand these concepts well, YouTube videos were prepared on the above topics with some practical examples.



<p>5.</p>	<p>Dr.M.Naveen Kumar</p>	<p>When liquids contain high solid loads, cake filtration is often used as a physical filtration technology. The liquid passes through the filter medium while the solids form a layer on its surface. During the filtration cycle, this layer retains other particles and becomes thicker, creating the 'filter cake'. Once particles start to bridge and build on the filter medium, they become the barrier for further particle retention. The filter medium becomes the carrier of the actual filter – the filter cake – and cake filtration occurs through this. If the solids present can't form the first initial layers, then a filter aid can be used to precoat the filter. Filter aids can also be added during filtration to maintain an open structure, ensuring the filter cake remains permeable and that a suitable flux and cake thickness is reached. Typical filter aids include cellulose, diatomaceous earth and perlite.</p> <p>Cake filtration is typically used in processes where fluids have been brought into contact with active ingredients, such as activated carbon, bleaching earth or catalysts. The characteristics of the liquid, solids and up and downstream processes determine the type of cake filtration used.</p>  <p>Experimental demonstration of cake filtration</p>
<p>6.</p>	<p>Mrs.L.Chandrankantha mma</p>	<p>A centrifugal pump is a mechanical device designed to move a fluid by means of the transfer of rotational energy from one or more driven rotors, called impellers. Fluid enters the rapidly rotating impeller along its axis and is cast out by centrifugal force along its circumference through the impeller's vane tips.</p>

A positive displacement pump moves a fluid by repeatedly enclosing a fixed volume, with the aid of seals or valves, and moving it mechanically through the system. The pumping action is cyclic and can be driven by pistons, screws, gears, lobes, diaphragms or vanes.

Valves provide several functions, including:

Regulating flow and pressure within a piping system. Controlling the direction of flow within a piping system. Throttling flow rates within a piping system. Improving safety through relieving pressure or vacuum in a piping system.



Live Demo in Skill Lab to understand different Pipes,Pumps and Valves

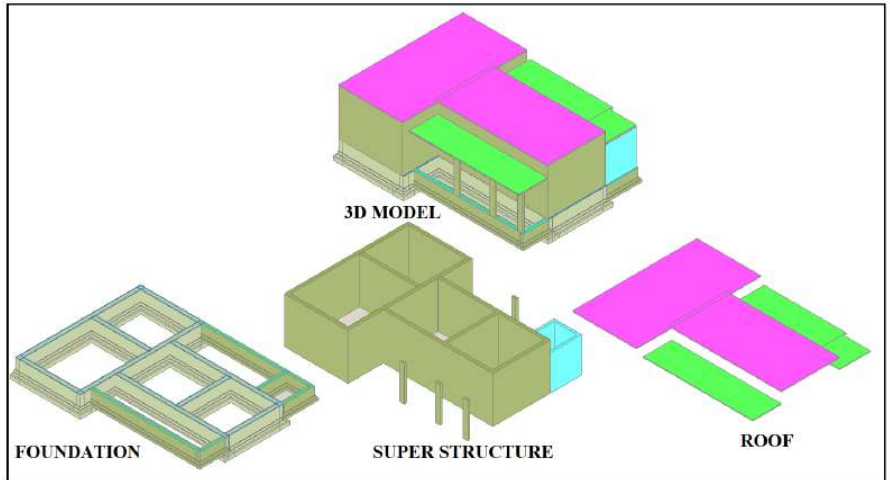
7.	Mrs.G.Prabha	<p>Detailing is as important as design since proper detailing of engineering designs is an essential link in the planning and engineering process as some of the most devastating connections. It is very important not only for the proper execution of the structures but for the safety of the structures</p> <p>Good detailing of reinforcements with proper drawings are important at the site as it helps the site engineers to place the reinforcement correctly for a good process of construction.</p> <p>The students learned the following details from the detailing diagram:</p> <ul style="list-style-type: none"> • Size and number of bars/ spacing of bars, • Lap and curtailment of bars/bending of bars • Development length of bars, • Clear cover to the reinforcement and • Spacer and chair bars <p>Representation of Bars in Drawings:</p> <ul style="list-style-type: none"> • Main bars are shown by thick single line. • Hanger bars are indicated by medium thick lines. • Stirrups are spotted by dotted or thin line <p>Do's for detailing:</p> <ul style="list-style-type: none"> • Prepare drawings properly & accurately if possible label each bar and show its shape for clarity • Indicate proper cover-clear cover, nominal cover or effective cover to reinforcement • Use commonly available size of bars and spirals. For a single structural member the number of different sizes of bars shall be kept minimum. • The grade of the steel shall be clearly stated in the drawing <p>Don 'T' for detailing:</p> <ul style="list-style-type: none"> • Reinforcement shall not extend across an expansion joint and the break between the sections shall be complete. • Flexural reinforcement preferably shall not be terminated in a tension zone • Bars larger than 36mm dia. Shall not be bundled • Where dowels are provided, their diameter shall not exceed the diameter of the column bars by more than 3mm • Where bent up bars are provided, their contribution towards shear resistance shall not be more than 50% of the total shear to be resisted.
----	--------------	---



Reinforcement Detailing Model

8.

Mr.M.Surendar



3D Modelling of the plan was developed using AutoCadd Software

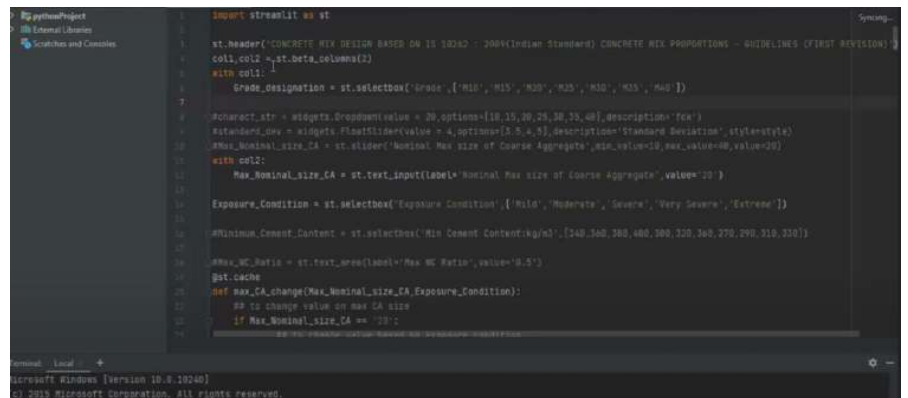
Outcomes of this Model:

On referring to the 2D Plan and with the help of 3D rendered drawing students found easy to understand and visualize the drawings. Which has helped them in taking quantities of works for different items of work in a short period

9.

Mrs.M.Amala

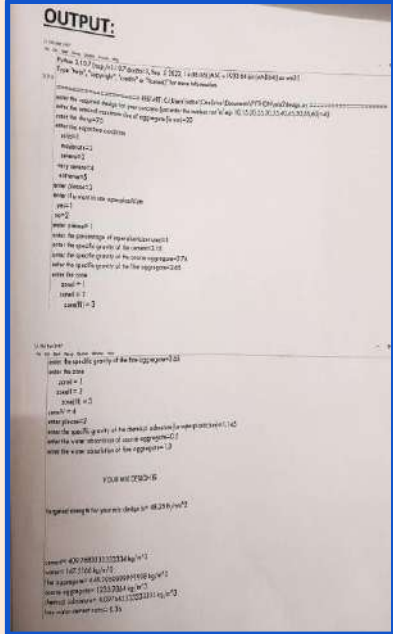
Developed Python Programming coding helps to find out the proportions of cement, coarse aggregate, fine aggregate and amount of water required for a perfect design mix of concrete. Design mix also helps to find out the total weight of concrete and its components required to cast moulds of different shapes like cubes, cylinders, beams and also slump cones. It helps the engineers to reduce their time consumption in design calculations and finding the results. And also helps to reduce human errors. Typical inputs for finding a design mix of concrete consists; SG of cement, coarse aggregate and fine aggregate, grading zones, exposure conditions, water absorption. And outputs of design mix consist of weights of coarse aggregate, fine aggregate and super plasticizer and cement and also the amount of water.



```
import streamlit as st

st.header('CONCRETE MIX DESIGN BASED ON IS 10262 - 2009(Indian Standard) CONCRETE MIX PROPORTIONS - GUIDELINES (FIRST REVISION)')
col1,col2 = st.beta_columns(2)
with col1:
    grade_designation = st.selectbox('Grade',{ 'M10', 'M15', 'M20', 'M25', 'M30', 'M35', 'M40'})
    #Concrete_spr = widgets.Dropdown(value = 20, options=[10,15,20,25,30,35,40], description='Rate')
    #Standard_dev = widgets.FloatSlider(value = 4, options=[2.5,4.5], description='Standard Deviation', style=style)
    #max_nominal_size_CA = st.slider('Nominal Max size of Coarse Aggregate', min_value=10, max_value=40, value=20)
    with col2:
        Max_nominal_size_CA = st.text_input(label='Nominal Max size of Coarse Aggregate', value='20')
    Exposure_Condition = st.selectbox('Exposure Condition', ['Mild', 'Moderate', 'Severe', 'Very Severe', 'Extreme'])
    #Minimum_Cement_Content = st.selectbox('Min Cement Content(kg/m³)', [340,360,380,400,380,360,340,290,310,330])
    #Max_WC_Ratio = st.text_area(label='Max WC Ratio', value='0.5')
    @st.cache
    def max_CA_change(Max_nominal_size_CA, Exposure_Condition):
        # To change value on max CA size
        if Max_nominal_size_CA == '20':
```

Programming in Python

		<pre> # Required data from table for mix design of concrete grade=float(input("Enter the required design for your concrete (Just enter the number not 'M' eg: 10,15,20,25,30,35,40,45,50,55,60)")) maxs=float(input("Enter the nominal maximum size of aggregate in mm")) slump=float(input("Enter the slump")) exposure=float(input("Enter the exposure condition: 1(Mild)-1, moderate(2), severe(3), very severe(4), Extreme(5)enter please")) concrete=input("Enter if u want to use superplasticizer (yes(1)/no(2)/enter please-") if con==1: sp=float(input("Enter the percentage of superplasticizer used")) spc=float(input("Enter the specific gravity of the cement")) spca=float(input("Enter the specific gravity of the coarse aggregate")) spfa=float(input("Enter the specific gravity of the fine aggregate")) wac=float(input("Enter the water/cement ratio: 1(0.40) = 2(0.45) = 3(normal) = 4(factor please-")) if con==1: spca=float(input("Enter the specific gravity of the chemical admixture in superplasticizer")) wac=float(input("Enter the water absorption of coarse aggregate")) waf=float(input("Enter the water absorption of fine aggregate")) # IS 456:2000 Table 5 *Exposure condition: 1(Mild) minimum cement content in kg/m³, Maximum water to cement ratio wac=45-1*(Mild), (30), 0.55, 1(Moderate), (200, 0.50), Severe, (100, 0.45), Very severe, (40, 0.45), Extreme, (30), 0.40) #Calculating the targeted strength for the mix design if grade=="10" or grade=="15": x=3.5 eHfgrade="20" or grade=="25": x=0.8 Hf(grade=40) </pre>	
		<p style="text-align: center;">Python Programming Concrete Mix Design coding</p>	<p style="text-align: center;">Python Programming Concrete Mix Design output</p>

10. Mr.R.Dinesh Kumar

The Virtual Labs project addresses the simulation-based Labs in various disciplines of science and engineering. Yet another objective is to arouse the curiosity of the students and permit them to learn at their own pace. This student-centric approach facilitates the absorption of basic and advanced concepts through simulation-based experimentation. Internet-based experimentation further permits use of additional web-resources, video-lectures, animated demonstrations and self-evaluation. Specifically, the Virtual Labs project addresses the following:

- Access to online labs as a complementary facility to those colleges that already have labs
- Training and skill-set augmentation through workshops and on-site/online training
- Virtual labs are any place, any pace, any-time, any-type labs. It is a paradigm shift in student-centric, online education.

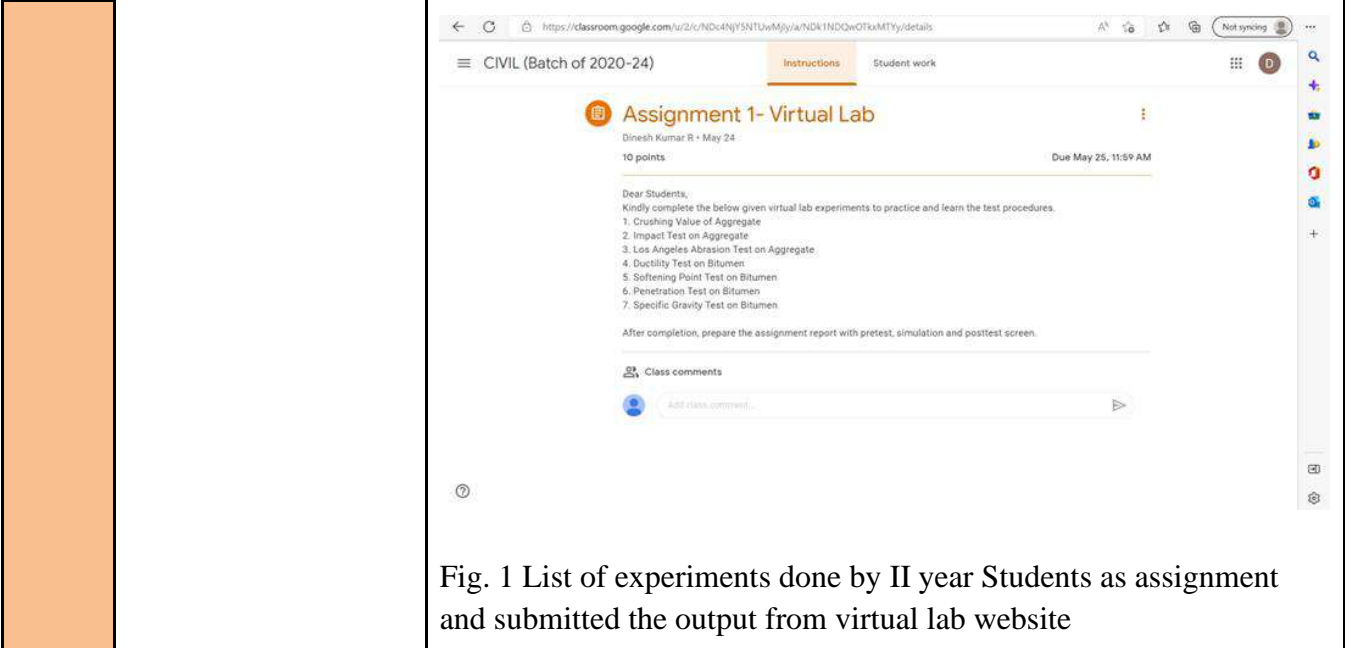


Fig. 1 List of experiments done by II year Students as assignment and submitted the output from virtual lab website

11.	Mr.Lenin Dhal	<p>Students went through the model preparation of drip irrigation system to have practical ideas and the process is helpful for students to understand the effective relationship between water and crops.</p> <p>Drip irrigation is the most efficient water and nutrient delivery system for growing crops. It delivers water and nutrients directly to the plant’s roots zone, in the right amounts, at the right time, so each plant gets exactly what it needs, when it needs it, to grow optimally. Thanks to drip irrigation, farmers can produce higher yields while saving on water as well as fertilizers, energy and even crop protection products. Water and nutrients are delivered across the field in pipes called ‘dripperlines’ featuring smaller units known as ‘drippers’. Each dripper emits drops containing water and fertilizers, resulting in the uniform application of water and nutrients direct to each plant's root zone, across an entire field.</p>
-----	---------------	--

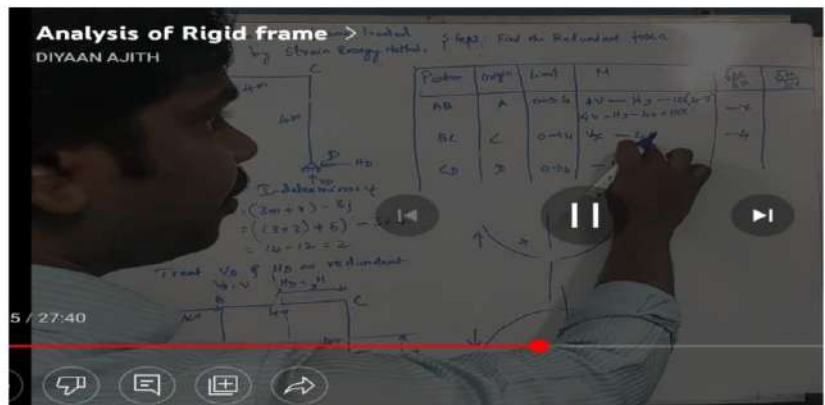


Model of drip irrigation system

12. Mr.J.Ajith

In this method of teaching Video lectures were prepared and shared to students prior to the class to develop a general understanding of the subject to give students the opportunity to grasp concepts at their own pace. Meanwhile, in-class time was dedicated to developing higher-order thinking through discussion and quiz was conducted at the end of the class. After this Flipped classroom strategy, 70% of the students marks were improved in Continuous assessment test 2 compared with Continuous assessment test 1.

FLIPPED CLASSROOM

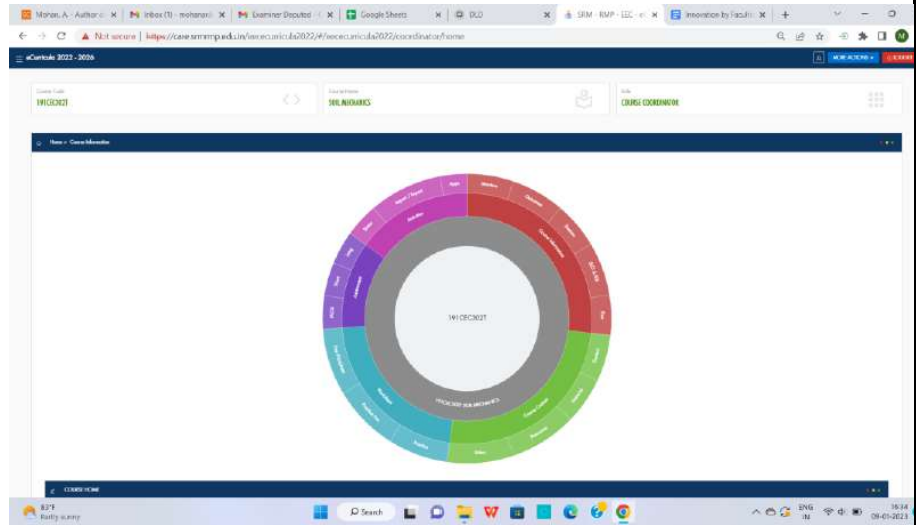


13.

Mr.A.Mohan

Learning material source is simply the way of teaching , it simplifies the method of teaching learning process and contributes to significant increases in student learning retention and graduation rates.

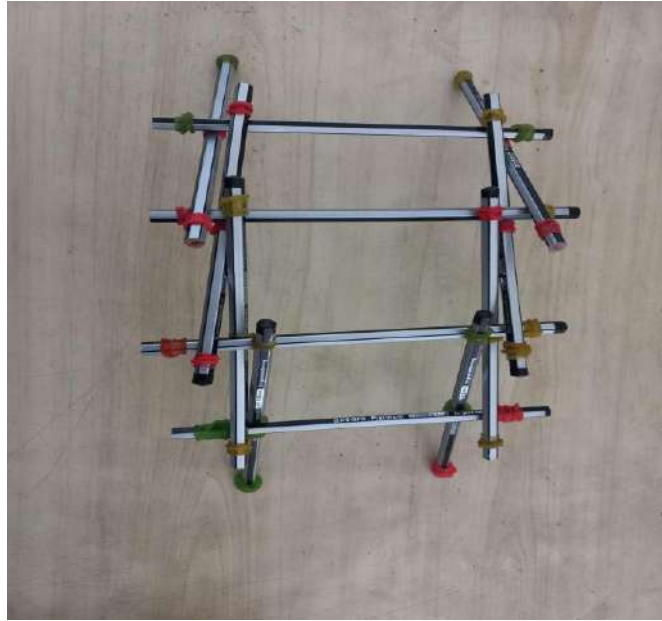
Establish the Institution as a System leader in the areas of Educational Research to enhance teaching learning process, LMS implementation for soil mechanics increases the students' learning and better understanding capacity. Students performance was considerably increase due to LMS implementation.



Innovation in Teaching Methods - Model Based Teaching

Name of the Faculty	Dr.R.Gopalakrishnan
Subject Name	Engineering Mechanics
Date	09.02.20
Year	2020-21
No of Students Participated	44
Objective	Demonstration of the principles through modeling.
Description of the Method	Demonstration through the small pencil bridge.

Photo with caption



A small Pencil bridge - Modelling

Out come

After demonstration through modeling, students got better understanding of the concepts of Friction, Center of gravity and load distribution and also learned lami's theorem.

Innovation in Teaching Methods - Model Based Teaching

Name of the Faculty

Dr.G.Senthil Kumar

Subject Name

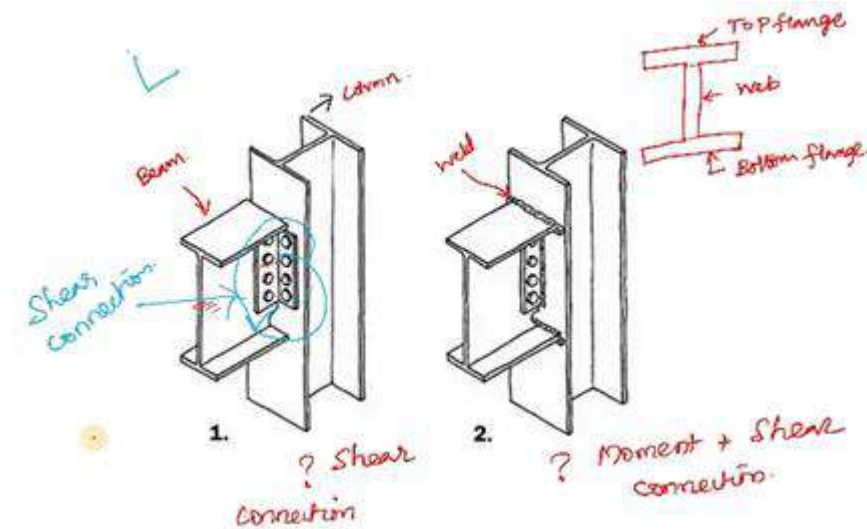
CE8703- STRUCTURAL DESIGN AND DRAWING

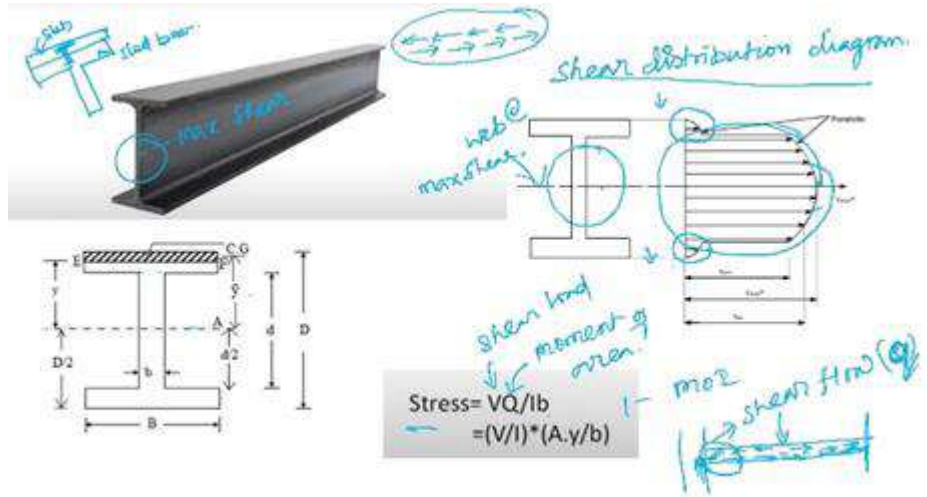
Date

16.11.2021

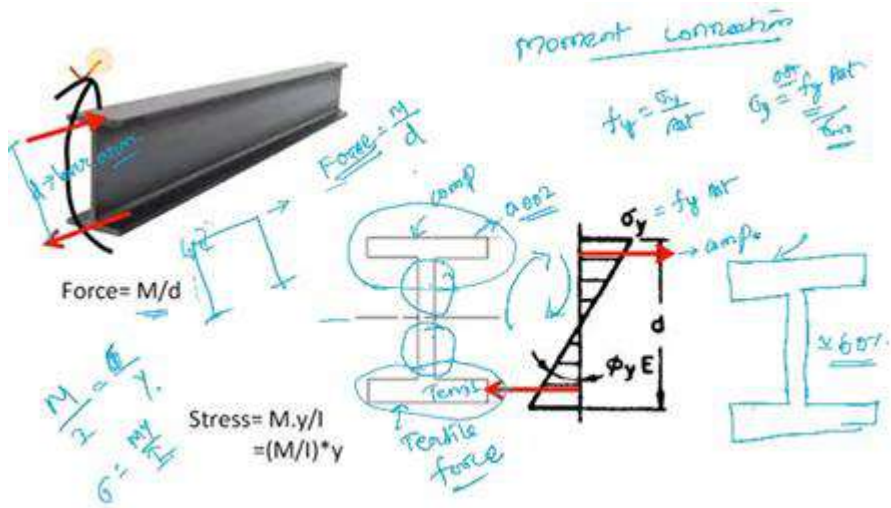
Year

IV

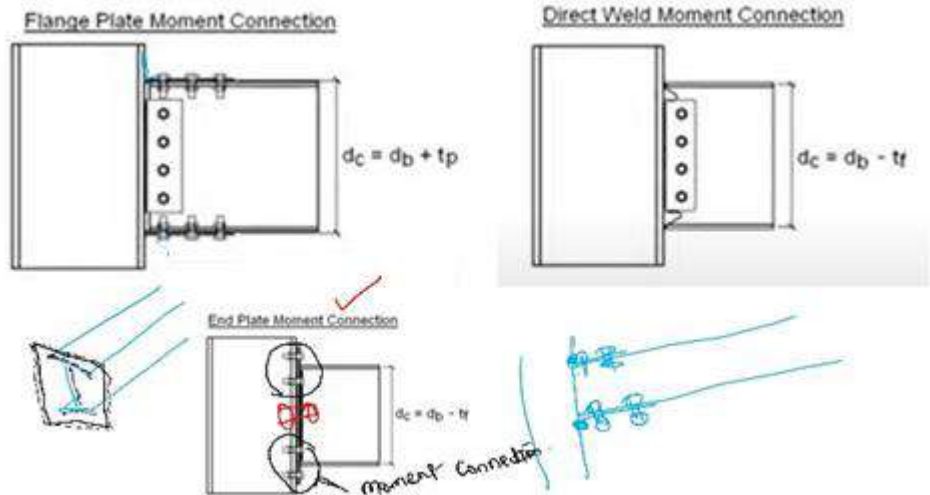
<p>No of Students Participated</p>	<p>48</p>
<p>Objective</p>	<p>To create better knowledge in connection design Simplified and distinguished between the shear and moment connection.</p>
<p>Description of the Method</p>	<p>Fundamental concepts of connections had been taught by pictorial representation as given in Fig. 1. In general, steel building experiences the following conditions in connections such as moment, shear, combined shear and moment connection had been taught by using picture and pen tablet. Students can easily understand and identify the shear and moment connection with the practical example. It resulted in students being able to understand the types of force/moment acting on the connection and he/she being able to design the connection accordingly. The few pictorial drawings and pen tablet explanation have been attached in the following Fig. 1 for your reference.</p>
<p>Photo with caption</p>	 <p>Shear Connection 2) Shear + Moment connection</p>



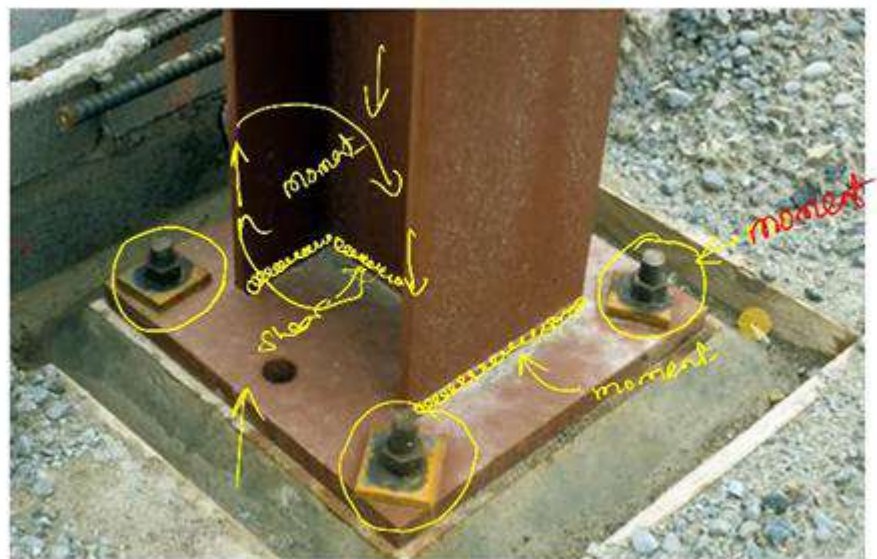
Shear distribution @ Flexural member



Stress Distribution @ Flexural member



Moment Connection



Pictorial view of Moment connection

Out come

Students can able distinguish between the shear and moment connections
 Moreover, students can able to identified the location of shear and stress concentrated at connection design
 Student can able to understand the moment and shear connection

Innovation in Teaching Methods - Model Based Teaching

Name of the Faculty	Dr.G.Velraj Kumar
Subject Name	191CEC304T Concrete Technology
Date	
Year	II
No of Students Participated	62
Objective	To determine the optimum percentage of superplasticizer for Concrete.
Description of the Method	<p>Marsh cone test is a test for finding the optimum dosage of plasticizers and superplasticizers for different types of cement. To find the amount of plasticizers added to concrete ranges from 0.1 to 0.5 % of the total weight of cement. First, you need to prepare a cement paste of 1L with a desired water-cement ratio by adding 2kg of cement to them. While preparing the cement paste, the mixing should take place in the mortar mixer. The mortar mixer is used to avoid the formation of lump at the bottom of the vessel. You can take water cement ratio ranging from 0.3 to 0.5.7 The 70 percent of water is added at the beginning of mixing in the first step and the remaining water is added in the second step with superplasticizers. The dosage of superplasticizer will be 0.1 percentage of the weight of cement. Take 1L slurry and pour into a marsh cone by closing the aperture with a finger. Start the stop and remove the finger. Note the time taken in seconds for complete flow out of cement paste. This time in seconds is called marsh cone time. Repeat the above steps with different amount of plasticizer with the desired water-cement ratio. The Saturation point</p>


is the dose at which marsh cone time is lowest. This dose is the optimum dose of superplasticizer or plasticizer for that brand or type of cement.

Photo with caption



Out come	<ol style="list-style-type: none"> 1. Students are able to understand tests on optimum percentage of Plasticizer /superplasticizer by marsh cone apparatus. 2. To understand the effect of Plasticizer /superplasticizer on concrete. 3. To Test with various types/Grades of cement and calculate the proper amount of Plasticizer /superplasticizer.
----------	---

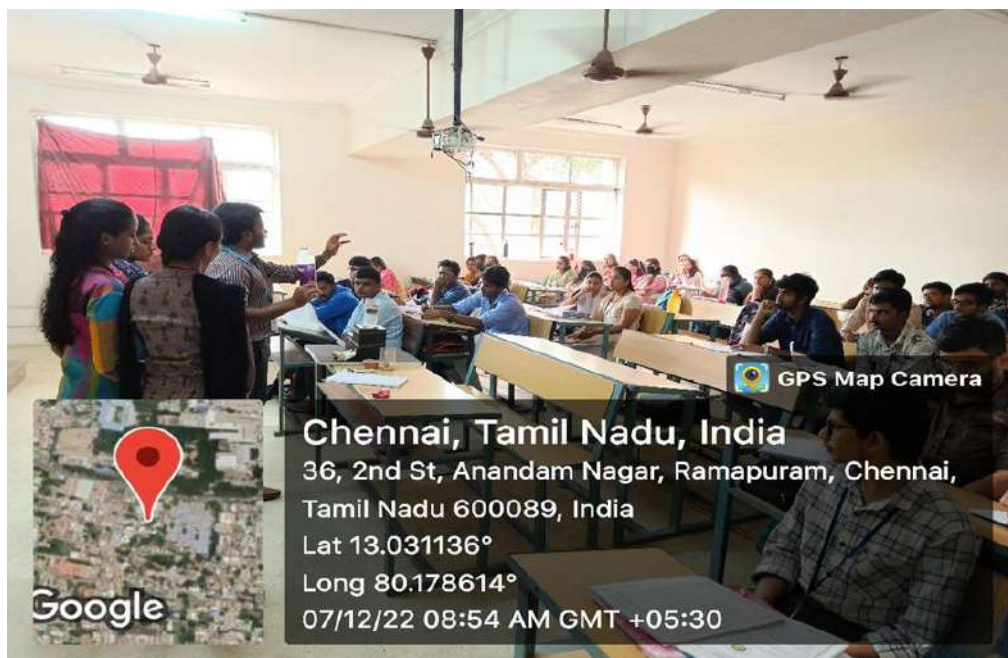
Innovation in Teaching Methods - Model Based Teaching	
Name of the Faculty	Dr.M.Siva
Subject Name	191CEO701T E-Waste Management
Date	21.11.2022
Year	IV year CSE, Mechanical and EIE
No of Students Participated	25
Objective	The objective is the utilization of E-waste products in the preparation of BOT model

<p>Description of the Method</p>	<p>E-waste is considered the "fastest-growing waste stream in the world" with 44.7 million tonnes generated in 2016- equivalent to 4500 Eiffel towers. In 2018, an estimated 50 million tonnes of e-waste was reported, thus the name 'tsunami of e-waste' given by the UN. Its value is at least \$62.5 billion annually.</p> <p>Society today revolves around technology and by the constant need for the newest and most high-tech products we are contributing to a mass amount of e-waste. Since the invention of the iPhone, cell phones have become the top source of e-waste products.</p> <p>In order to create awareness among the students for the reuse and recycling of E waste products, students were given training on utilization of E waste products like Batteries, Aduino boards, waste plastic products, copper wires in the making of a BOT system.</p>
<p>Photo with caption</p>	 <p style="text-align: center;">Students with BOT model</p>
<p>Out come</p>	<p>Students gained handson experience on utilization of E waste products in the making of a working model 100% results were obtained in the internal assessments through better understanding</p>

Innovation in Teaching Methods - Model Based Teaching

Name of the Faculty	Dr.M.Naveen Kumar
Subject Name	Green Building Design
Date	07.12.2022
Year	IV
No of Students Participated	60
Objective	Experimental setup for cake filtration model demonstration imparting practical knowledge for better understanding of concept
Description of the Method	<p>When liquids contain high solid loads, cake filtration is often used as a physical filtration technology. The liquid passes through the filter medium while the solids form a layer on its surface. During the filtration cycle, this layer retains other particles and becomes thicker, creating the 'filter cake'. Once particles start to bridge and build on the filter medium, they become the barrier for further particle retention. The filter medium becomes the carrier of the actual filter – the filter cake – and cake filtration occurs through this. If the solids present can't form the first initial layers, then a filter aid can be used to precoat the filter. Filter aids can also be added during filtration to maintain an open structure, ensuring the filter cake remains permeable and that a suitable flux and cake thickness is reached. Typical filter aids include cellulose, diatomaceous earth and perlite.</p> <p>Cake filtration is typically used in processes where fluids have been brought into contact with active ingredients, such as activated carbon, bleaching earth or catalysts. The characteristics of the liquid, solids and up and downstream processes determine the type of cake filtration used.</p>

Photo with caption



Experimental demonstration of cake filtration


Out come

Filtration techniques influence the student's to bring sustainable solutions to the environment.
Filtration techniques indicate to bring eco-friendly and cost-effective treatment.
Student's creativity levels has increased by this activity.

Innovation in Teaching Methods - SKILL LAB


Name of the Faculty

Mrs.L.Chandrankanthamma

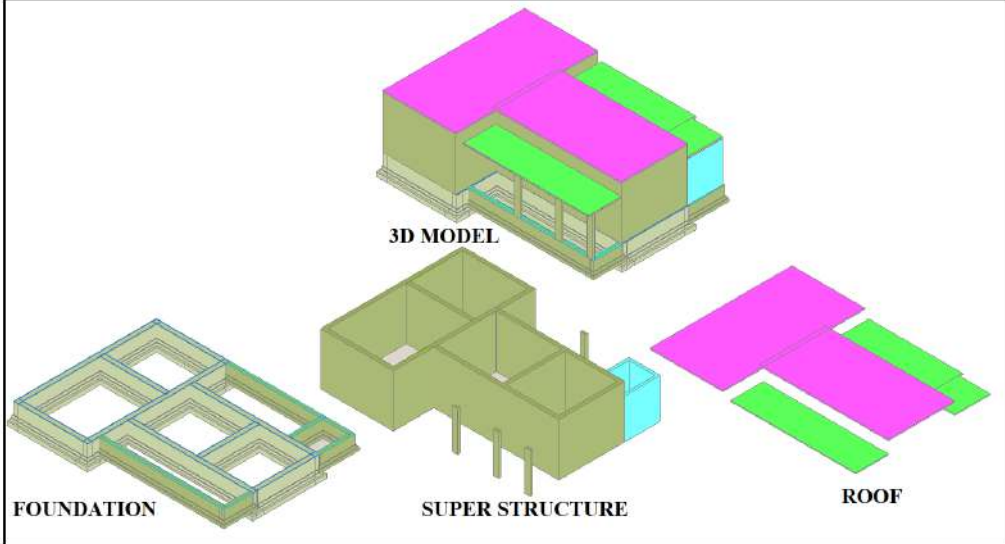
Subject Name	CE 8403 APPLIED HYDRAULIC ENGINEERING
Date	07.01.20
Year	II YEAR
No of Students Participated	55
Objective	Imparting Practical Knowledge Through Live Demonstration(Skill Lab) For Better Understanding Of Concept
Description of the Method	Learning With Live Demonstration of Lab in Lehry Instrumentation & Valves Pvt Ltd
Photo with caption	 <p><u>Live Demo in Skill Lab to understand different Pipes,Pumps and Valves</u></p>

Out come	100% PASS IN CE 8403 APPLIED HYDRAULIC ENGINEERING

Innovation in Teaching Methods - Model Based Teaching	
Name of the Faculty	Mrs.G.Prabha
Subject Name	STRUCTURAL DESIGN I (RCC)
Date	17.12.2021
Year	III
No of Students Participated	52
Objective	To understand the detailing of reinforcement for various concrete elements

Description of the Method	<p>Detailing is as important as design since proper detailing of engineering designs is an essential link in the planning and engineering process as some of the most devastating connections. It is very important not only for the proper execution of the structures but for the safety of the structures</p> <p>Good detailing of reinforcements with proper drawings are important at the site as it helps the site engineers to place the reinforcement correctly for a good process of construction.</p> <p>The students learned the following details from the detailing diagram:</p> <ul style="list-style-type: none"> Size and number of bars/ spacing of bars, <u>Lap</u> and curtailment of bars/bending of bars Development length of bars, Clear cover to the reinforcement and Spacer and chair bars
Photo with caption	 <p style="text-align: center;">Detailing of Reinforcement in Structural Design I(RCC) was explained to III yr Students on 17.12.2021</p>
Out come	<p>Students designed the RCC elements with the basic thumb rule and as per the codal provisions</p>

Innovation in Teaching Methods - Model Based Teaching	
Name of the Faculty	Mr.M.Surendar

Subject Name	Estimation Costing and Valuation Engineering
Date	25.08.2022
Year	IV Year
No of Students Participated	38
Objective	3d Rendered Model of a 2D plan was developed in order to estimate the quantity of item of work in a residential building
Description of the Method	3D modeling was done by using AUTOCADD Software and estimation of quantities of the same was visually described by taking the sections at required places.
Photo with caption	 <p>The image displays three 3D architectural models of a residential building. At the top center is the complete '3D MODEL' showing a multi-story structure with a pink roof and green walls. Below it, on the left, is the 'FOUNDATION' model, showing the concrete base and ground level. In the center is the 'SUPER STRUCTURE' model, showing the walls and columns without the roof. On the right is the 'ROOF' model, showing the pink roof slabs and green parapets. Each model is labeled with its respective component name in bold capital letters.</p>

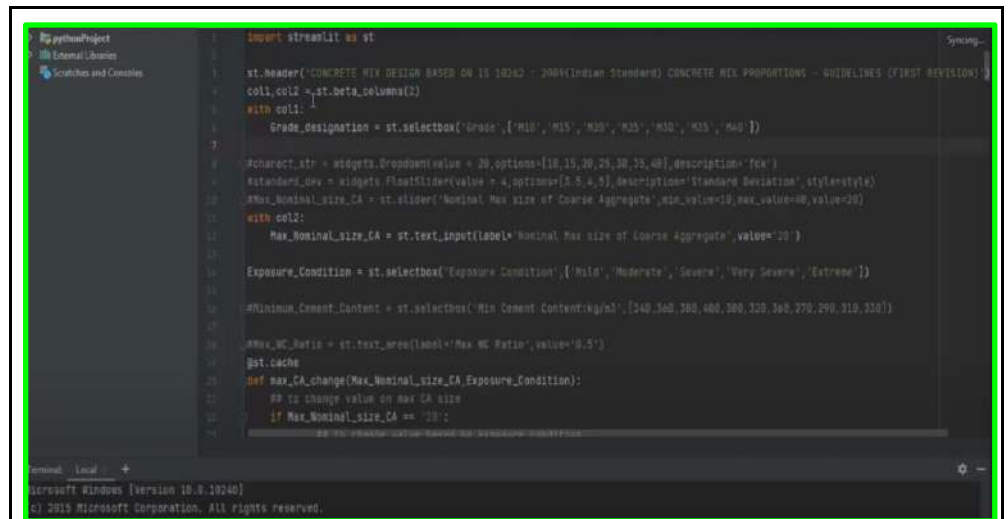
Out come	Students clearly understood the section and were able to visualize the elements in the building and got familiar in taking the quantities.
----------	--

Innovation in Teaching Methods - Modern Tool Usage	
Name of the Faculty	Mrs.M.Amala
Subject Name	Material Testing Lab
Date	17.11.2022
Year	II
No of Students Participated	55
Objective	A Python Program coding was developed in order to find out the mixed design of a concrete. Also the weight of concrete and its components required to cast moulds of different shapes like cubes, cylinders and also slump cones were incorporated.

Description of the Method

Developed Python Programming coding helps to find out the proportions of cement, coarse aggregate, fine aggregate and amount of water required for a perfect design mix of concrete. Design mix also helps to find out the total weight of concrete and its components required to cast moulds of different shapes like cubes, cylinders, beams and also slump cones. It helps the engineers to reduce their time consumption in design calculations and finding the results. And also helps to reduce human errors. Typical inputs for finding a design mix of concrete consists; SG of cement, coarse aggregate and fine aggregate, grading zones, exposure conditions, water absorption. And outputs of design mix consist of weights of coarse aggregate, fine aggregate and super plasticizer and cement and also the amount of water

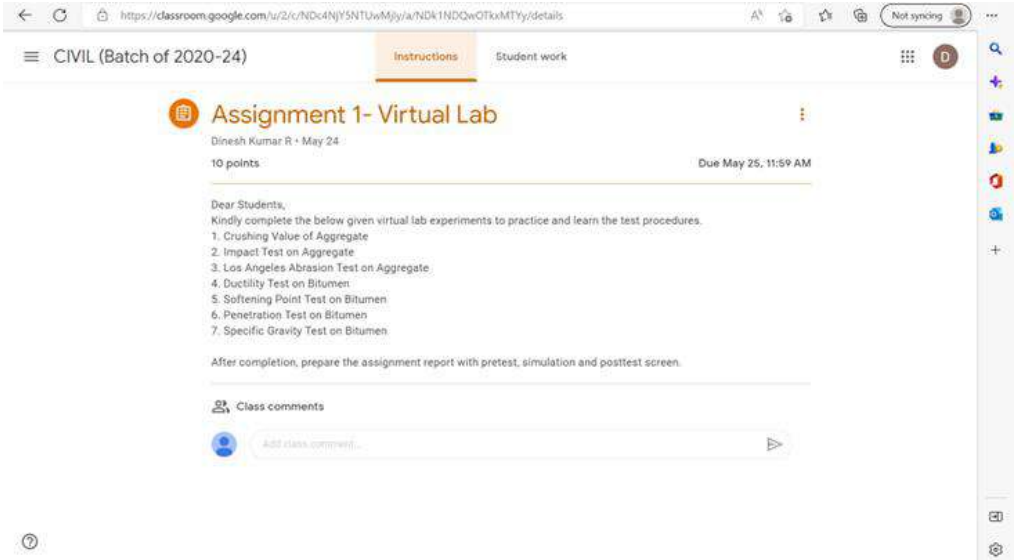
Photo with caption




```
import tkinter as tk
1
2 st.header('CONCRETE MIX DESIGN BASED ON IS 10242 - 2004(Indian Standard) CONCRETE MIX PROPORTIONS - GUIDELINES (FIRST REVISION)')
3 col1,col2 = st.beta.columns(2)
4 with col1:
5     Grade_designation = st.selectbox('Grade',[M10,M15,M20,M25,M30,M35,M40])
6
7     Proportect_str = widgets.DropdownMenu(value = 20,options=[10,15,20,25,30,35,40],description='fcx')
8     Standard_dev = widgets.FloatSlider(value = 4,options=[3.5,4,5],description='Standard Deviation',style=style)
9     Max_Nominal_size_CA = st.slider('Nominal Max size of Coarse Aggregate',min_value=10,max_value=40,value=20)
10 with col2:
11     Max_Nominal_size_CA = st.text_input(label='Nominal Max size of Coarse Aggregate',value='20')
12
13     Exposure_Condition = st.selectbox('Exposure Condition',['Mild','Moderate','Severe','Very Severe','Extreme'])
14
15     Minimum_Cement_Content = st.selectbox('Min Cement Content:kg/m3',['340,360,380,400,360,320,290,310,330'])
16
17     Max_WC_Ratio = st.text_area(label='Max WC Ratio',value='0.5')
18
19 @st.cache
20 def max_CA_change(Max_Nominal_size_CA,Exposure_Condition):
21     ## To change value on max CA size
22     if Max_Nominal_size_CA == '20':
23         return 10
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
```

Python Programming Coding for Concrete Mix Design

Date	25.05.2022
Year	II
No of Students Participated	55
Objective	The main objective of this virtual lab is to conduct all standardized tests to assess the quality of highway materials and pavements
Description of the Method	<p>The Virtual Labs project addresses the simulation-based Labs in various disciplines of science and engineering. Yet another objective is to arouse the curiosity of the students and permit them to learn at their own pace. This student-centric approach facilitates the absorption of basic and advanced concepts through simulation-based experimentation. Internet-based experimentation further permits use of additional web-resources, video-lectures, animated demonstrations and self-evaluation. Specifically, the Virtual Labs project addresses the following:</p> <p>Access to online labs as a complementary facility to those colleges that already have labs</p> <p>Training and skill-set augmentation through workshops and on-site/ online training</p> <p>Virtual labs are any place, any pace, any-time, any-type labs. It is a paradigm shift in student-centric, online education.</p>

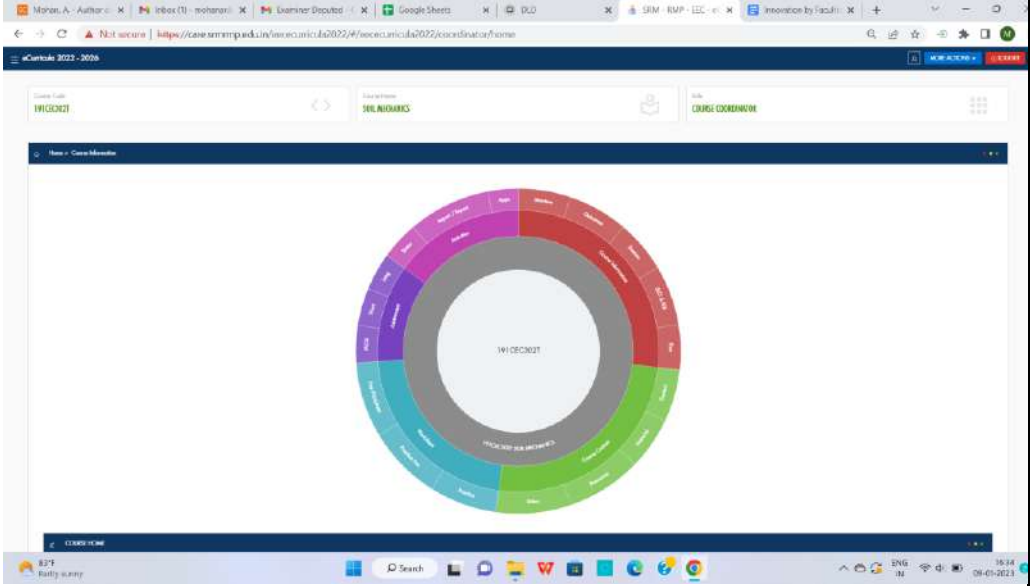
<p>Photo with caption</p>	 <p>Fig. 1 List of experiments done by II year Students as assignment and submitted the output from virtual lab website</p>
<p>Out come</p>	<p>Students completed the virtual lab experiments and attended the pretest and posttest of the experiment. This virtual lab experiments enhances the confidence of the students to do the experiments in laboratory with research orientation</p>

<h2 style="text-align: center;">Innovation in Teaching Methods - Model Based Teaching</h2>	
<p>Name of the Faculty</p>	<p>Mr.Lenin Dhal</p>
<p>Subject Name</p>	<p>191CEE501T- IRRIGATION ENGINEERING</p>
<p>Date</p>	<p>20.12.2022</p>

Year	III
No of Students Participated	55
Objective	<p>Irrigate a field where there is scarcity of water, it has low discharge rate , as no huge amount of water is required by the plant.</p> <p>Once installed no extra efforts are required to irrigate the field like in sprinkler irrigation ,changing of pipes , sprinklers, shifting it from one place to other.</p> <p>It can be used for wide variety of crops even sugarcane,watermelons except rice,singhada etc</p>
Description of the Method	<ul style="list-style-type: none"> • High availability of water and nutrients • Doses of water and nutrients tailored to plant’s development needs • No saturation and good soil aeration • Avoids high salinity caused by excessive fertilizer application • No wetting of foliage that can result in fungal diseases
Photo with caption	 <p style="text-align: center;">Model of a drip irrigation system</p>

Out come	<p>Drip irrigation is the most efficient method of delivering water and nutrients to crops.</p> <p>It delivers water and nutrients directly to the root zone of the plant in the right amounts and at the right time, ensuring that each plant receives exactly what it requires, when it requires it, to grow optimally</p> <p>Students learned about the effective water crop relationship by this model</p>
----------	--

Innovation in Teaching Methods - LMS Implementation	
Name of the Faculty	Mr. A.Mohan
Subject Name	191CEC302T - SOIL MECHANICS
Date	03-10-2022
Year	II YEAR
No of Students Participated	62
Objective	To Engage Institution faculty, staff, students, to work in a collaborative environment to create rich, engaged learning and teaching experiences.

<p>Description of the Method</p>	<p>Learning material source simply the way of teaching Contribute to significant increases in student learning retention and graduation rates. Establish the Institution as a System leader in the areas of Educational Research. LMS implementation for soil mechanics increases the students' learning and better understanding capacity.</p>
<p>Photo with caption</p>	 <p>The image is a screenshot of a web browser displaying a circular diagram. The diagram has a central grey circle with the text 'WU DECISION'. Surrounding this is a ring divided into several colored segments: red, green, blue, purple, and orange. Below the ring, the text 'PROCESSED BY METHODS' is visible. The browser's address bar shows a URL starting with 'https://case.smmmp.edu.in/...'. The Windows taskbar at the bottom shows the date as 08-01-2022 and the time as 15:14.</p>
<p>Out come</p>	<p>Students clearly understand the various types of learning methodology to enhance better teaching and learning process. It makes the students learn and understand better .</p>