



Vidya Vikas Education Trust's

# Universal College of Engineering

Near Bhajansons and Punyadham, Kaman Bhiwandi Road, Vasai, Palghar-401208.  
(Permanently Unaided | Approved by AICTE, DTE & Affiliated to University of Mumbai)  
**Accredited with B+ Grade by NAAC** | Gujarati Linguistic Minority Institution



Association of Civil Engineering Students

OCTOBER 2021

Vol. 4 | Edition 4



# THE BENCHMARK



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Mr. Rajesh Dubey  
-H.O.D. Civil

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## Editor's Desk



We are pleased to present October 2021 edition of Benchmark. In this edition you will find an article on Three Gorges Dam and contribution by Students and Faculty members of Department of Civil Engineering highlighted in the month of September. News update and departmental activities are the part along with Canva.

### Department Vision:

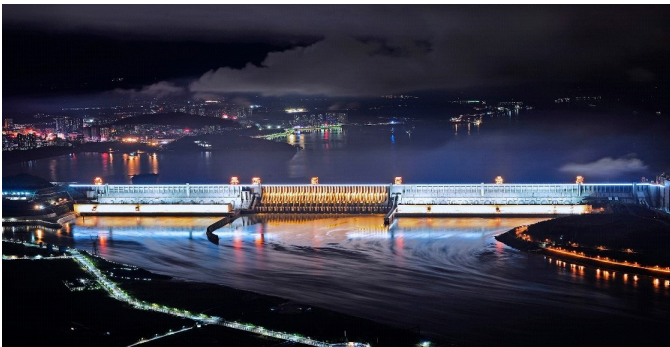
- To excel in every area of Civil Engineering, inculcate research oriented study to explore hidden talent.
- Providing Opportunity to display creativity, out of the box thinking & innovativeness, aimed at providing cutting edge technology for sustainable development.

### Department Mission:

- Providing qualified, motivated faculties to deliver the content using updated teaching methodology, inviting industry experts from various areas to disseminate subject knowledge in Civil Engineering.
- Motivating students to undertake the Research Oriented studies, participate in competitions at all levels, grasping new techniques and methods which can be improved on further.
- Conducting and participating in seminars, workshops and training programs with a view to make the students industry ready and improve their employability factor for global career ahead.
- To create quality professionals capable of planning, designing and analytical skills for better infrastructural development in the field of Civil Engineering.

## World's Largest Hydroelectric Producing Dam: Three Gorge Dam

Three Gorges Dam, a type of gravity dam is situated on the Yangtze River (Chang Jiang) just west of the city of Yichang in Hubei province of China. The construction of the dam officially began in 1994 and it was the largest engineering project in China. At the time of its completion in 2006, it was the largest dam structure in the world. The construction of this dam is remarkable. The engineers had to face several problems at the initial days of the construction of the dam, they had to build stone cofferdam to block all the parts of the river to build the first section of the dam.



This massive structure is built up of approx 28 million cubic meter of concrete. Once the construction of the dam was completed the cofferdams were removed and the turbines were built within the dam. Almost 32 turbines were been installed within the dam with 34 generators of approximately 6,000 tones producing renewable energy. Each turbine has the capacity of producing up to 700 Mega Watt which makes this dam a world's largest Hydro-Electric producing power station.

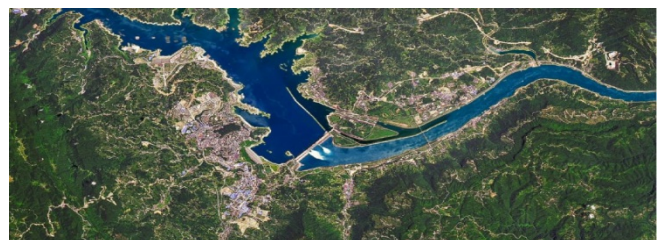
The foundation of the dam does not get deteriorate. The spillway gates are be constructed alongside of concrete which shoots the water at 100 meters downstream without any potential damage. Due to the construction of the three gorges dam the risk of the flooding has be reduced since it releases the water through out in a controlled manner. Due to

the construction of the three gorges dam, the economic growth has been increased.



The height of the structure of this dam is about 113 m and is 2,335 m (7,660 ft) long with a maximum height of 185 m (607 ft). It incorporates 28 million cubic metres of concrete and 463,000 metric tons of steel into its design. Submerging large areas of the Qutang, Wu, and Xiling, gorges for some 600 km upstream.

Limited hydroelectric power production was begin in year 2003 and gradually increased as additional turbine generators came online over the years until 2012. Those units, along with 2 additional generators, gave the dam the capacity to generate 22,500 megawatts of electricity making it the most productive hydroelectric dam in the world. As well as producing electricity, the dam is intended to increase the Yangtze River's shipping capacity. The dam also was intended to protect millions of people from the periodic flooding that plagues the Yangtze basin.



The dam is a third of the way along the river, which winds 6,300 km (3,910 miles) from glacial Tibetan marshlands to the Yellow Sea near Shanghai. NASA has calculated that the dam only slows the rotation of Earth by 0.06 microseconds, which is six

hundredths of a millionth of a second. Three Gorges Dam costed about US \$ 37 billion. More exactly, this is the dynamic investment in total. The audit result suggests that the static investment is U.S \$ 20 billion.

-BY OMKAR SANKHE  
T.E. CIVIL

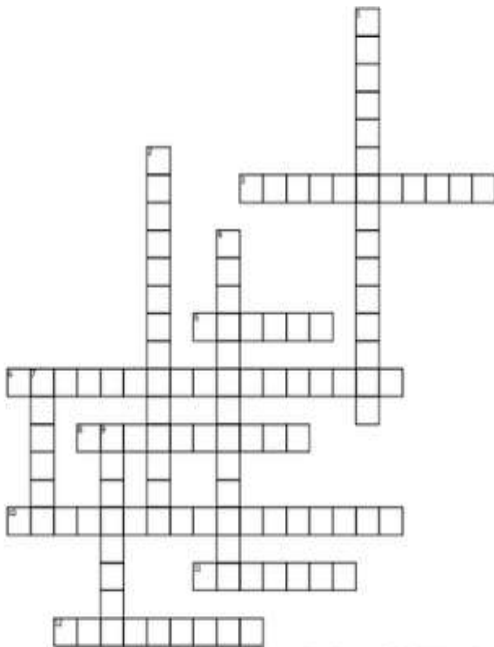
### DID YOU KNOW

The Three Gorges Dam had been planned for over more than 100 years and about 1.2 Million people are been relocated for the construction of the dam.

*To know more about Three Gorges Dam,  
Scan the QR Code*



## *SOLVE THE CROSSWORD*



#### **Across**

3. What is Flow of warm, oxygen rich water downward to deeper water
5. what is "Normal" year, easterly trade winds and ocean currents pool warm water in the western Pacific, allowing upwelling of nutrient rich water off the West coast of South America.
6. What is MOVEMENT OF WATER LIKE A RIVER IN THE MIDDLE OF OCEAN WATER.
8. What is Largest surface current that transports more water than all rivers on Earth combined in a years time and carries large amounts of heat

10. What is a current that the sun heats from near the equator and near the poles

11. What is A long high sea wave caused by an earthquake or other disturbance ?

12. What is The movement of deep, cold, and nutrient-rich water to the surface

#### **Down**

1. What is horizontal movement of ocean water that is caused by wind and that occurs at or near the ocean's surface.

2. What is an inertial force (also called a fictitious force)[1] that acts on objects that are in motion relative to a rotating reference frame.

4. What is a continuous, directed movement of seawater

7. What is (oceanography) a warm ocean current that flows along the equator from the date line and south off the coast of Ecuador at Christmas time

9. What is a subsurface current that is near shore and that pulls objects out to sea ?

## Application of natural coagulant for turbidity removal

Experiments were carried out on moringaoleifera Seeds and moringaoleifera fruit shell and terminaliabelirica(bheda) and terminaliachebula(harde,haritaki) used in this study were moringaoleifera obtained from theDahisar and Borivali local vegetable market and the terminaliabelirica and terminaliachebula obtained from Dahisarayurvedic Shop respectively.All coagulation experiments were carried out using synthetic artificial turbid water. Digital turbidity meter is used to measure turbidity of samples. A conventional jar test apparatus was used in the experiments to coagulate sample of synthetic turbid water using coagulant

The different purposes of the tree are many as all parts of the tree are used. Oil extracted from the seeds is used for working machinery, cosmetics, cooking and soap. The press cakes, what is left after the oil extraction, is used as soil fertilizer.

Moringa seeds contain dimeric cationic proteins which absorb and neutralize colloidal charges in turbid water, causing the colloidal particles to clump together, making the suspended particles easier to remove as sludge by either settling or filtration. Moringa seed cake removes most impurities from water. This use is of particular interest for being nontoxic and sustainable compared to other materials..



Terminaliachebula(Haritaki,Harde) (Baheda)



### Preparation of standard known turbidity solutions

- Standard solution preparation methods
- Solution 1: 10grams of Hexamethylenetetramine ( $\text{CH}_2\text{CL}_4$ ) is dissolved in 100milliliter of distilled water.
- Solution 2: 1.0gram of Hydrazine Sulphate ( $\text{N}_2\text{H}_4\text{H}_2\text{SO}_4$ ) is dissolved in 100 milliliter of distilled water.

- Procedure for preparing 400 NTU standard solutions:

5 milliliter of solution 1 and 5 milliliter of solution 2 were mixed. This mixture was kept aside for 24 hours at  $25 \pm 3^\circ\text{C}$ . This solution diluted to 100 ml with distilled water. This solution has the turbidity value of 400 NTU.

### **Turbidity meter**

Turbidity meters are used to quickly measure the turbidity (or cloudiness) of water, caused by suspended solid particles. Understanding how turbidity meters work can help in achieving more accurate results and ensuring the samples and meter are handled correctly.

#### **Reading of effectiveness test with drumsticks**

Jar number	Dosage mg/800ml	Initial turbidity (NTU)	Final turbidity (NTU)	Removal %
1	600	470	40	91.48
2	1200	470	45	90.42
3	1800	470	46	90.21



#### **Reading of terminaliachebula (Harde) test with synthetic turbid water**

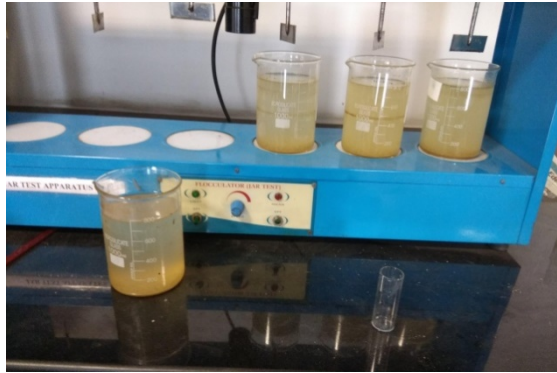
Jar number	Dosage (Mg/800ml)	Initial turbidity (NTU)	Final turbidity (NTU)	Removal%
1	600	208	23	88.94
2	1200	208	29	86.05
3	1800	208	30	85.57

#### **Reading of terminaliabelirica (Behada) test with synthetic turbid water**

Jar number	Dosage (Mg/800ml)	Initial turbidity (NTU)	Final turbidity (NTU)	Removal%
1	600	220	35	84.09
2	1200	220	41	81.36
3	1800	220	46	79.09

#### **Reading of all three natural coagulant mix in equal proportions**

Jar number	Dosage (Mg/800ml)	Initial turbidity (NTU)	Final turbidity (NTU)	Removal%
1	600	355	20	94.36
2	1200	355	23	93.52
3	1800	355	25	92.95



**Jar test apparatus**

Conclusion: Using some locally available natural coagulants, for example, *Moringaoleifera*, *terminaliabellirica*, and *terminaliachebula* significant improvement in removing turbidity and total coliforms from synthetic raw water was found. Maximum turbidity reduction was found for highly turbid waters. After dosing, water-soluble extract of *Moringaoleifera*, *terminaliabellirica* and *terminaliachebula* reduced turbidity to 4, 5 and 6 NTU respectively from 200 NTU. It is also found that these natural coagulants reduced about 89–94% of total turbidity.

**Prof. Rajesh Dubey**  
Head of Department  
Dept. of Civil Engg. UCoE

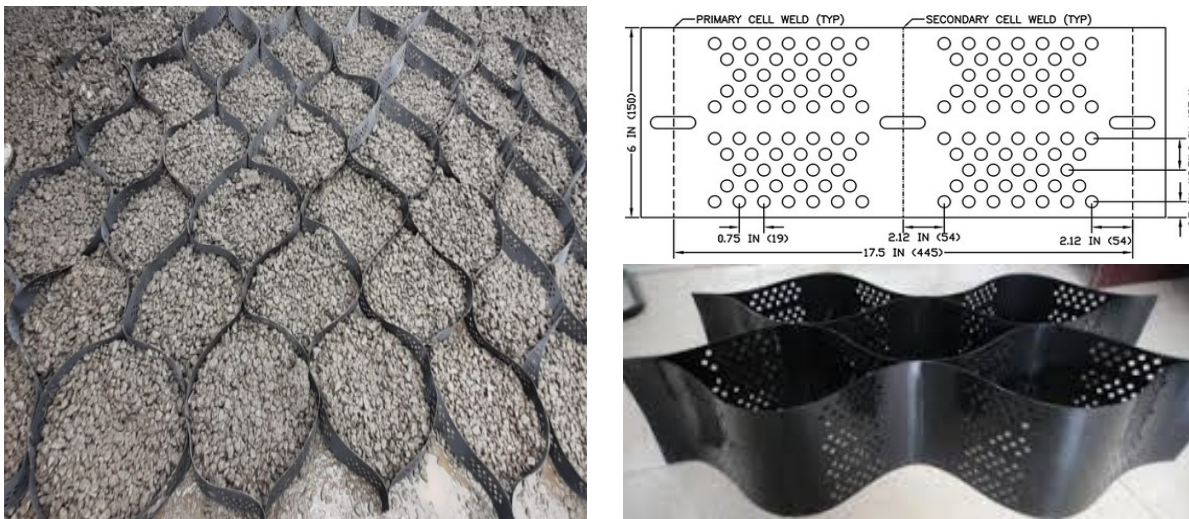
*SPOT THE DIFFERENCE*



## ROAD SHOULDER STABILIZATION USING GEO-CELL

Maintenance of paved and unpaved roads and highways has been a major issue for all road owner authorities. When the roads are not appropriately designed and constructed, life of the roads drastically reduces causing disruption of the traffic. Such roads develop pot-holes, develop uneven riding surfaces, and tend to settle over stretches, thereby disrupting traffic movement. The geotechnical environment was completely revolutionised with the application of geosynthetics, starting with the humble non-woven to the more complex geo-composites. Most of these systems are two-dimensional. Cellular confinement systems add the third dimension to geosynthetics, which open up more avenues of applications, ranging from providing strength to geo-systems, to protection against erosion. The System Cellular Confinement Systems are popularly known as “Geocells”. Geocells are strong, lightweight, three-dimensional systems fabricated from ultrasonically-welded High Density Polyethylene (HDPE) strips that are expandable on-site to form a honeycomb-like structure (Fig. 1).

**Figure 1: Geo-cell & Geo-cell infill with coarse aggregate**



Geocells are filled with compact non-cohesive soils which are confined within the cellular walls. The composite forms a rigid to semi-rigid structure. The depth of the geocells as well as the size of each cellular unit can vary as per design requirements. Typically, the infill is sandy or gravelly material. However, the infill may be plain concrete depending on the application such as erosion protection, water channel formation, etc. The surface of the geocell is textured to increase soil-geocell wall friction. The geocell wall is punctured (Fig. 1) to assist in immediate dissipation of storm water as well as of developed porewater pressures due to increased stresses within the infill of the individual cells. Geocells infilled with sand / metal as subgrade improve the strength of the pavement & shoulder, reducing settlements, formation of reflective crack and pot-holes. Besides, use of geocells not only reduces the thickness of the pavement, shoulder section but also significantly reduces downtime due to maintenance.

Eliminate low and soft shoulder problems using the geocell system infilled with road gravel. With geocell confinement, problematic road shoulder erosion areas and rutting are essentially eliminated while maintaining drivable functionality. The geocell system creates stable shoulders that reduce typical maintenance by up to 3 times, and protect sealed pavement from deterioration and edge breaks. Design geocell shoulders with permeable aggregate or engineered topsoil/aggregate infill for strong grassed shoulders that also reduce stormwater runoff. Fig. 2: Sequence of road shoulder stabilisation using geo-cell.

### Geocell Road Shoulder Stabilization Benefits:

- Creates permeable, stable shoulders that reduce rutting and eliminate degradation of the shoulder and adjacent sealed pavement.
- Stabilizes infill material and controls shearing, lateral and vertical movement.
- Increases the effective structural number, cutting fill requirements and costs in half.
- May allow use of lower-quality, less costly on-site infill materials.

### Environmental Benefits:

Reduce stormwater runoff and receive environmental Low Impact Development (LID) benefits by infiltrating and storing stormwater on-site.

- With permeable infill, the geocell system saves the cost of traditional stormwater collection/storage systems by performing as an on-site stormwater retention/detention.
- Permeable pavements are cooler pavements that reduce the heat island effect of traditional hard-surfaced pavements.



Initial Site condition & removal of loose materials



Preparation of Base & Spreading of Geocell



Filling, compacting & surface finishing of shoulder



**Figure 2: Sequence of road shoulder stabilisation using geo-cell**

**Project Students:** Mukesh Meena, Omkar Sankhe, Sachin Patil, Harsh Rane, Hinal Poriya, Ritesh Sharma, Uzma Shaikh

**Faculty & Staff:** Prof. Rajesh Dubey, Mr. Sachin Pawar and Mr. Ramchandra Khapre



# ALUMINI CORNER

Hello everyone, I have completed my diploma in civil engineering from Thakur Polytechnic & bachelor's degree from Universal college of engineering. Currently I am working as a Project Engineer in BEST GEOTECHNICS PVT LTD. In my previous company I had worked as a Site Engineer in Geo Profiles & Engineering Services Pvt Ltd.

I am pursuing my career in geotechnical engineering. It all started from my first internship in second year where I was an intern in one of residential construction site. But somehow, I did not find that work interesting. Then in third year I did internship in one of company in IIT Gandhinagar. That was more of a desk job of drawing & analysis on a software. There also I did not get interest in doing that work. But in my both internships I observed that every civil work starts with foundation which is indirectly connected to soil. Therefore, I decided to take electives of ground improvement & foundation engineering. These two subjects deepened my interest in geotechnical field. Then I decided that geotechnical engineering is the branch in which I want to pursue my career.

In last semester I knew that if I want job in market, I need to do some training/internship in geotechnical engineering. I applied in lot of companies but Geo Profiles Engineering gave me chance. Later after my BE they gave me offer to join their company. I worked for one year as a Site Engineer and now I am Project Engineer at BEST GEOTECHNICS PVT LTD. Along with job I am learning courses from NPTEL to explore this field and I am constantly learning new things. At last I would like to tell all my young mates that don't do things by choice, do things by passion. Civil engineering is a very vast branch and it has an biggest impact on society. Then also if you really want to know what exactly civil engineering is then do once visit my website <https://constructorsfeed.com/>. At last, I would like to tell that

**" If you know what you don't know be inquisitive about it,  
But if you don't know what you know than you are in big trouble"**



CBR Test



Electric Resistivity Test

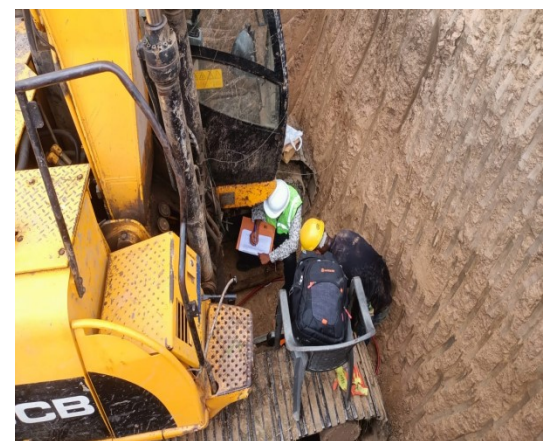


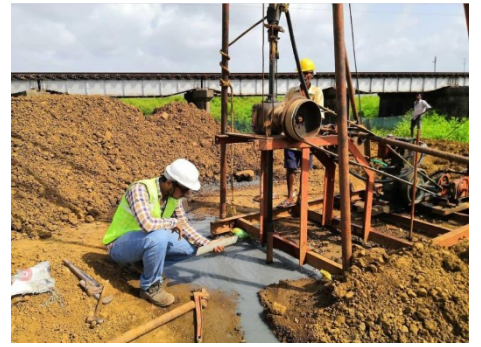
Plate Load Test



Ground Improvement



Block Vibration Test



Geotechnical Investigation

**-Mr. Mirajj Thaker**

B.E. Civil

Batch 5, UCoE

*SOLVE THE EQUATION*

$$\begin{array}{|c|c|c|} \hline & \text{blue} & \\ \hline \text{red} & \text{red} & \text{green} \\ \hline \end{array} + \begin{array}{|c|c|c|} \hline \text{green} & \text{red} & \text{blue} \\ \hline \text{blue} & & \text{green} \\ \hline \end{array} = ?$$



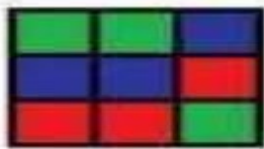
**a**



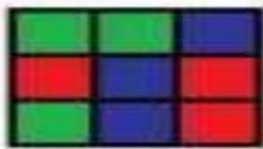
**b**



**c**



**d**



**e**



**f**

**"The man who does not read books has no advantage over the one who cannot read them."**

**- Mark Twain**

# News Bulletin



## Illegal quarrying caused recent landslide at Nandi Hills near B'loru: Activists

The environmentalists have stated that the landslide that occurred at the Nandi Hills, located near Bengaluru, was triggered by the illegal stone crushing units that operate in the region. The government's official stand is that the landslide was caused by heavy rain. "Several trees have been cut for development work, resulting in soil erosion," environmentalist Chidananda Murthy said.



## PM Modi visits new Parliament building site at night for first-hand inspection

PM Narendra Modi visited the construction site of the new Parliament building in Delhi at 8.45 pm on Sunday. He reportedly spent almost an hour there to do a first-hand inspection of the construction status of the building. Notably, he arrived from the US in the afternoon today. Pictures showed PM surveying the site while wearing an engineer's hat.



## Landslide blocks highway in U'khand; several vehicles damaged

Several vehicles were damaged due to a landslide near Rudraprayag area on Rishikesh-Badrinath National Highway in Uttarakhand, pictures of which surfaced on Saturday. The landslide was triggered by heavy rainfall since the last four days. The highway is being cleared, but it's expected to take several hours. Due to blockage, essential commodities couldn't reach Chamoli and Rudraprayag districts.



## Concrete for building houses on Mars made, has astronaut blood: UK scientists

Scientists in Britain claimed they've created a new material suitable for constructing buildings in extra-terrestrial environments like Mars, by using space dust and "blood, sweat and tears of astronauts". A human blood protein combined with urea (from sweat, urine, tears) could glue together simulated Martian soil to make a material (Astrocrete) with 300% more strength than ordinary concrete.



## Delhi govt issues guidelines for construction firms to curb dust pollution

Delhi government has released 14-point guidelines for private construction firms to curb dust pollution. The guidelines included that all the firms will have to mandatorily cover the periphery of their sites with tin walls so that dust from the site doesn't blow out. The guidelines also mandate that the agencies cover construction material with a tarpaulin or a green net.



## Defence Ministry approves construction of Pune's Bopkhel bridge

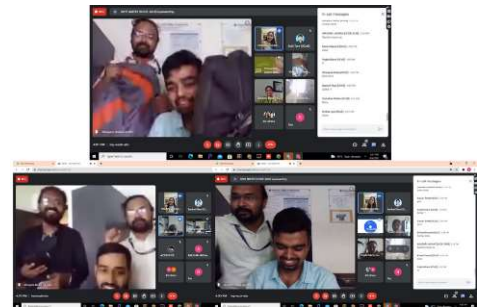
The Defence Ministry has given its final approval for the construction of a bridge in Bopkhel over the Mula river on its land. BJP MLA Laxman Jagtap and Deputy Mayor Hirabai Ghule thanked the Centre on behalf of people of Bopkhel. Deputy Mayor Ghule said that the bridge will be completed and will open for people in a few months.



# DEPARTMENTAL ACTIVITIES

## TEACHERS DAY

The Association of Civil Engineering Students in collaboration with National Service Scheme (NSS) of UCoE, celebrated Teacher's Day on 4<sup>th</sup> September, 2021. The Event was led by the NSS team. The team ACES had prepared a 'Treasure Hunt' game for the teachers wherein the teachers were shown a clue and were given time to think and hunt for the answer to that particular clue. Miss Pranali Gudekar was hosting the game. The game had engaged the teachers and brought out the fun and enjoyment which made the event fulfill its purpose.



## GANESH CHATURTHI

Ganesh chaturthi is celebrated annually to mark the birth of lord Ganesha. This year ganesh chaturthi was celebrated on 10<sup>th</sup> of September 2021, Friday.



## ENGINEERS DAY

The Association of Civil Engineering Students along with other committees of UCoE conducted an online Technical event for engineering students called 'TANTROTSAV' with multiple events. Students from various engineering fields showcased their technical knowledge. The event was streamed LIVE on YouTube.



# UPCOMING EVENTS

## INTRODUCTION TO GEO-SYNTHESIS

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An Initiative by IQAC  
In Association with  
Association of Civil Engineering Students (ACES)  
IES Students Chapter- UCoE

Presents an Expert Lecture on  
**INTRODUCTION  
TO GEO-SYNTHESIS**

**Mr. Riddesh Joshi**  
KEYNOTE SPEAKER  
Masters in Geotechnical Engineering and  
Engineering Geology at UNSW, Sydney,  
New South Wales, Australia

**WEDNESDAY, 13TH OCTOBER 2021**  
Time - 2:00 pm  
**FREE REGISTRATION**  
Gmeet link: <https://meet.google.com/jh-jkyf-efg>

Geosynthetics are man-made materials used to improve soil conditions. The webinar will be conducted by guest speaker Mr. Riddesh Joshi in association with ACES on 13th October, 21 at 2pm.

ACES feels immense pleasure to inform you that Mr. Riddesh is an alumni of Universal College of Engineering (Batch 4)

## DISASTER MANAGEMENT WITH FOCUS ON LANDSLIDES

It gives us an immense pleasure to inform you that UCoE's Internal Quality Assurance Cell (IQAC), in association with The Association of Civil Engineering Students (ACES) is organizing a webinar program on "Disaster Management with Focus on Landslides" by Dr. Mahesh Sharma, University Institute of Technology (UIT) Himachal Pradesh University Shimla.

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Presents an Expert Lecture on  
**DISASTER  
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WITH FOCUS ON  
LANDSLIDES**

**Dr. Mahesh Sharma**  
KEYNOTE SPEAKER  
Assistant Professor & Head  
Department of Civil Engineering  
University Institute of Technology (UIT)  
Himachal Pradesh University Shimla

**TUESDAY, 12TH OCTOBER 2021**  
Time - 3:30 pm  
**FREE REGISTRATION**  
Gmeet link: <https://meet.google.com/ry-dabm-grr>

### DID YOU KNOW !!

Venus is the hottest planet in the solar system and has an average surface temperature of around 450° C.

# CANVAS



**YASH PATIL**  
**B.E. CIVIL**



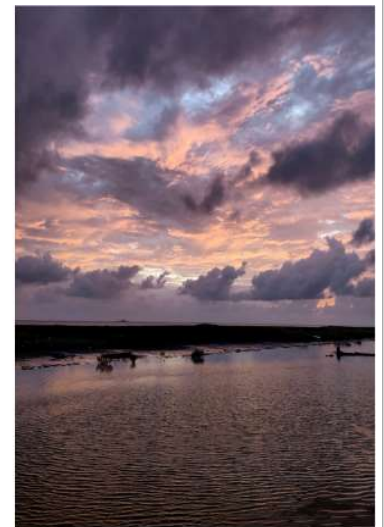
**YASH PATIL**  
**B.E. CIVIL**



**KALPITA CHAFEKAR**  
**B.E. CIVIL**



**DHRUV PARMAR**  
**B.E. CIVIL**



**YASH PATIL**  
**B.E. CIVIL**

ANSWER TO SOLVE THE EQUATION : B