

5.1. Innovations by the Faculty in Teaching and Learning (20)

GOALS:

In order to improve students' teaching experience aside from traditional classroom teaching, the department uses novel concepts and their subsequent execution by means of quantifiable programmes with following goals:

The department will continuously strive to:

- Enrich student learning by innovative practices.
- Develop students' comprehension and expertise of creative methods and strategies.
- Broaden students' perspective of emerging technologies and tools in academics, contemporary and social issues by innovative strategies.
- Motivate students to innovatively think, formulate and perform through different club activities.

List of initiatives in teaching and learning process followed by the department:

Each and every faculty use innovative practices, knowingly or unknowingly to enhance the teaching learning experience of every student and make understand the concepts through out the year. Some initiatives may be so small to escape attention, and might be difficult to quantify and record; but may affect the learning of students in a subtle but important way. On the other hand, some initiatives might be so impactful so as to be clearly visible as making huge strides in improving the teaching-learning process.

Given below is a listing of some of the noticeable initiatives taken by the faculty of the department. However, it should not be construed as a conclusive list; but as a part of an open ended process of continuous improvement.

1. Student Chapter activities: The department has following professional chapters which provides a good platform for the students to take active part in the various completions, seminars and lectures arranged by the society. The activities help the students to showcase their talents in terms for team building, communications skills, team work, target work and overall development in professional activities. One faculty advisor is associated with each student chapter for mentoring, guidance and overall governance.

- i. IEI Students Chapter
- ii. AIChE Students Chapter

iii. IICHe Student Chapter

Glimpses

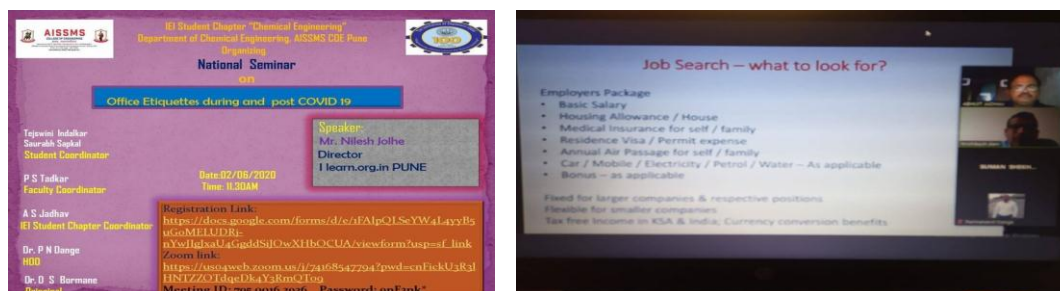


Fig 5.5.1 Guest Lecture - Mr Niesh Jolhe Director i-learn.org



Fig 5.5.2 On 9-11-2020 IEI Students Chapter Chemical Engg., and NSS AISSMS COE donated Mask,

2.Virtual labs: In certain labs like the dynamics of machinery lab, some relevant experiments are conducted online on web browsers with the help of simulators. Such online facilities are called as virtual labs (<http://www.vlab.co.in/>), and are a part of an excellent innovative initiative taken by the MHRD of India. Virtual Experiment of IIT vlabs on Response of Stirred Tank Heater was conducted online for the practical subject, PDC of B.E. Chemical

Simulator

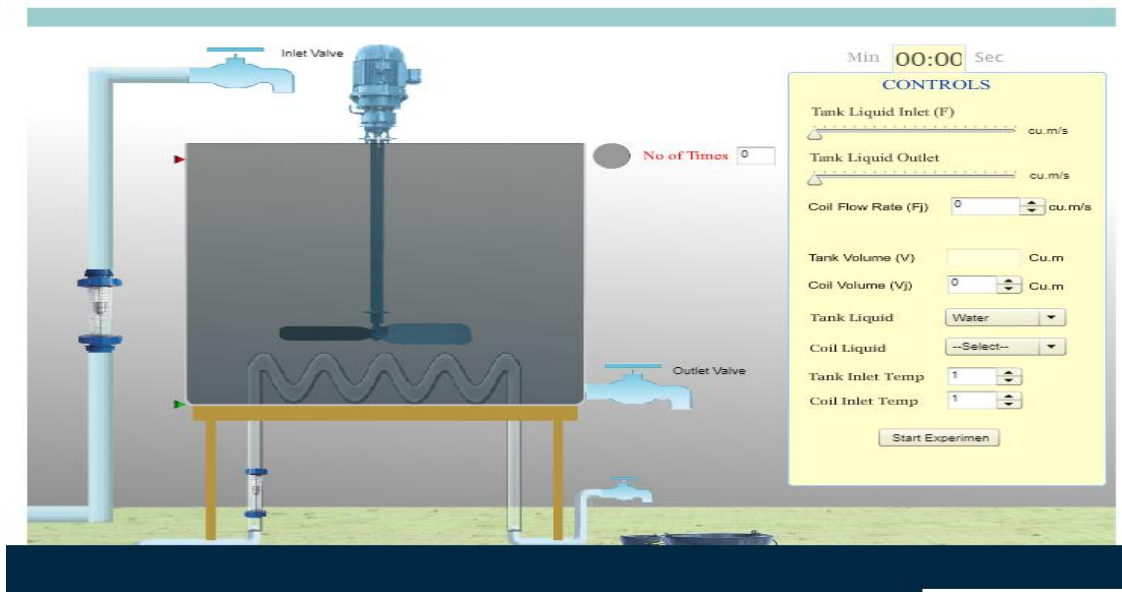


Fig 5.5.3 .Virtual Experiment of V Labs on SFD & BMD introduced to the students of S.E. Chemical in the practical of POD subject practicals

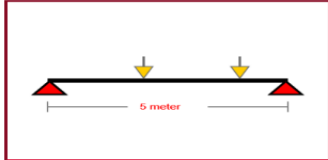
Strength Of Materials → List Of Experiments

Experiment Name

Shear force and bending moment diagrams for simply supported beams with point load

Simulation Pop Up Procedure

Select one of the Questions. The answers will be displayed after the simulation ends.
[Question 1](#) [Question 2](#)



| Force | Magnitude (in "N") | Distance from left Support (in "m") |
|-------|--------------------|-------------------------------------|
| F1 | 4 | X1 |
| F2 | 7 | X2 |

$R_A = 1$

$R_B = -4$

Please calculate Shear Forces at all points manually and verify them here.

Put value of SF; right

verify

Fig 5.5.4 POD Virtual Lab (vlab) Content copy

3. Project based Learning and working models: In many relevant subjects, faculty encourage the students to make miniature working models of mechanisms and machine components. The faculty members also make use of cut sections as well as working models to enhance interest and level of learning.

The final year undergraduate curriculum includes completion of a one year project with comprehensive viva voce. Hence, the final year students are divided in 2 to 4 member teams for executing the project tasks allotted by their project adviser(s). Also, the students are given chances for pursuing their final year projects in prestigious institutions like ICT, National laboratories (NCL Pune) and in the institutions in abroad. As a result many undergraduate project teams have published their project works in prestigious international journals and conference proceedings.

4. Use of models/Animations/ Mini projects/PPTs/CASE studies :

The department has cut sections of the solids which are used to teach Engineering Graphics subject. The department also has cut section of the engine parts which helps students to understand the concept in a better way. Some faculty members develop models as well as mini projects with the help of students. All the classrooms are well-equipped with high quality projectors ready for use any time.

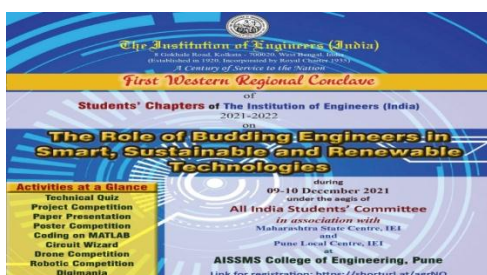


Fig 5.5.5 Regional Conclave of Students on Coding of “MATLAB”

Department of Chemical Engineering AISSMS COE, PUNE-01 conducted First Regional Conclave of Students' Chapter of The Institution of Engineers (India) for Western Region for the year 2021-22 , 09-10 December 2021. “Coding of MATLAB” event conducted by Department of Chemical Engineering. Total students Participated in event is 95

5. Learning resources on ERP/MS Teams: Faculty frequently upload notes, presentations, assignments, videos and test results on ERP as well as MS Teams. This significantly boosts the out-of-class learning experience of students.

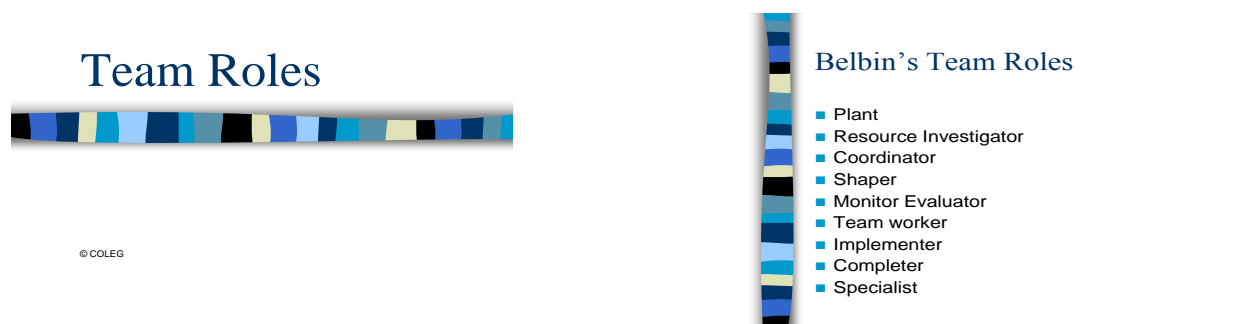


Fig 5.5.6 Learning Resources

6.E content on YouTube: Faculty have also created their own YouTube Channels and Google drives wherein they upload study material relevant to their own subjects. The links are shared with the students and the contents are openly accessed by all students.

Link : <https://youtu.be/4VCB4EoARTo>

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| Molecular weight = Addition of atomic weight | | |
|---|--------------------------------------|---|
| Chemical formula | Name | Molecular weight |
| CCl_4 | carbon tetrachloride | $1\text{C} + 4\text{Cl} = 12 + 4(35.5) = 154$ |
| CHCl_3 | chloroform | |
| $\text{CH}_2\text{CHCHCH}_2$ | 1,3-butadiene | |
| CH_2ClCOOH | chloroacetic acid | |
| CH_2Cl_2 | dichloromethane | |
| CH_2O | formaldehyde | |
| $\text{CH}_2\text{OHCH}_2\text{OH}$ | ethylene glycol | |
| CH_2CCH | propyne | |
| $\text{CH}_2\text{CHCHCH}_3$ | 2-butene | |
| CH_2CHCH_2 | propene | |
| CH_3CHO | acetaldehyde | |
| $\text{CH}_3\text{CH}_2\text{Br}$ | bromoethane | |
| $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ | butanol | |
| $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ | 1-propanol | |
| $\text{CH}_3\text{CH}_2\text{COOH}$ | propionic acid | |
| $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$ | diethyl ether | |
| $\text{CH}_3\text{CH}_2\text{OH}$ | ethanol | |
| CH_3COCH_3 | acetone | |

Fig 5.5.7 Video Lecture of Prof K B Gandhi in subject Engineering Materials

7. Online Lectures using MS Teams/Google meet/Zoom/Google classroom platform :

In the pandemic situation, the faculty members have taken special efforts to prepare powerpoint presentations and conducted lectures on regular basis using various platforms. The notes were shared alongwith lecture recordings with the students. The class tests as well as practice testes alongwith revision lectures were also conducted to help the students to prepare for the university

examinations.

1. Google Classroom:

- i. Subject: Process Dynamics & Control: Following Google Classroom was used to provide Lectures Notes, ppts, reference books, papers, question bank, model answers:
(<https://classroom.google.com/c/MzE5MjA5MjMwOTky?cjc=kzxgi45>)
- ii. Subject: Petroleum Refining: Following Google Classroom was used to provide Lectures Notes, ppts, reference books, papers, question bank, model answers:
(<https://classroom.google.com/c/MzE5MjA5MjMxMTAz?cjc=qx3n4n6>)
- iii. Subject: Principles of Design: Following Google Classroom was used to provide Lectures Notes, ppts, reference books, papers, question bank, model answers
(<https://classroom.google.com/c/NDY5NTMzOTkyNzA4?cjc=gwdpgyf>)

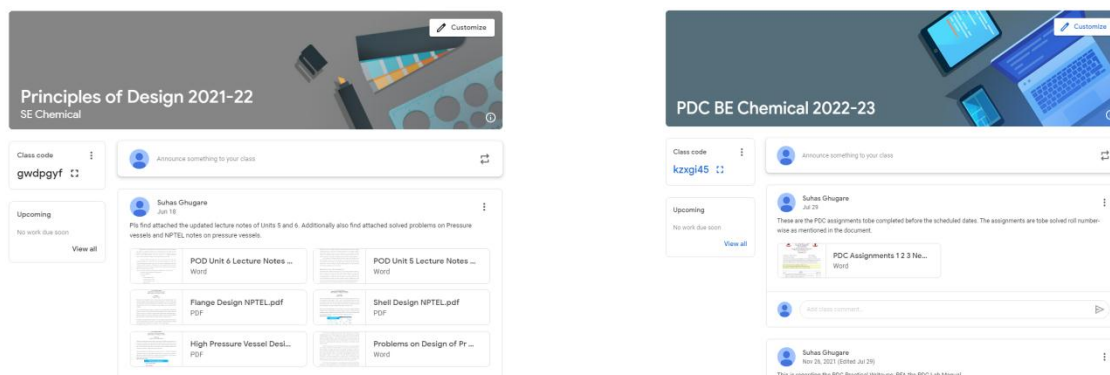


Fig 5.5.8 Google Classroom

2. NPTEL Lectures:

- NPTEL lecture videos and PPTs were presented for the subject, Process Dynamics & Control
(<https://archive.nptel.ac.in/courses/103/101/103101142/>)
- NPTEL lecture videos and PPTs were presented for the subject, Principles of Design
(https://onlinecourses.nptel.ac.in/noc22_ch29/preview)

8.Classroom quiz sessions: This help in creating interest by breaking monotony of regular classes while enhancing the learning experience. Every year Quiz is conducted in CHEMIXIR The AIChE Student Chapter, Department of Chemical Engineering AISSMS COE Pune, organized a Quiz competition on 1st October 2021 under 16th AISSMS Engineering Today-

2021, “CHEMIXER”. The quiz was organized to challenge and broaden the mind of the participants.

The quiz was conducted in 2 rounds. Quiz questions were based on Fluid Mechanics, Process Calculations, and general Science. The first round (elimination round) was based on Multiple choice questions which started at 10:30 am and ended at 11:10 am. Among several participants, 12 participants were promoted to the second round based on merit. The result of 1st round was declared at 11:30 am. The second round of the competition was based on the comprehensive question and answers which exactly started at 12:00 pm and ended at 12:45 pm between all promoted participants. Winners for the competition were decided based on marks obtained in the second round.

To ensure that the participants were clear with all doubts, the meeting was held at 10:00 am before the start of the competition. All rules of the competition were briefly explained in the meeting. Extending the vote of thanks, one of the student coordinators expended gratitude towards faculty coordinators and all participants. Winners of the competition were declared in the excellence award ceremony.

1.Mr. Darshan Desadla and Ms. Dikshita Mehta were declared as the winner and runner-up of the quiz competition respectively.

2. Students Symposium:

The department conducts **Engineering Today (CHEMIXIR)**, an annual national level student symposium, in the month of September every year to encourage the students organizing and participating in various events to enhance their skills. The institute also conducts **science exhibition** where the testing facilities and projects are exhibited to SE and TE students as well as students invited from nearby schools.

IEI Student Chapter "Chemical Engineering" Conducted Engineering Today “CHEMIXIR” event **Poster Presentation Competition** on 30th Sept 2021 from 10AM to 1AM. Total 6 Poster Presentation were given by the participants. Students from different colleges participated in this competition. They get a good technical platform to present their technical skills.

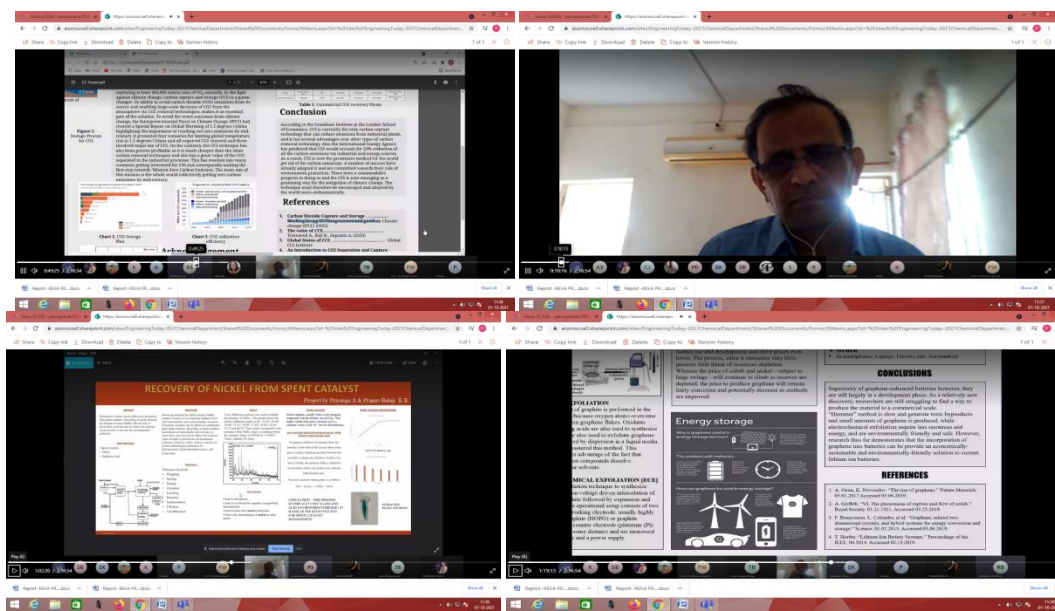


Fig 5.5.9 Mr. Sameer Sathe (Appttrain System, Vadodara, Consultant- Chemical Engineer and trainer)

10. Laboratory sessions – (Spreadsheet based calculations for Process Control Lab, ASPEN, & MATLAB)

(i) The teaching of computer aided process simulation lab is usually consists of black box teaching (Students are clueless about what the simulation software is doing for them). As an innovative practice, the students are taught to develop equations for all the equipment models that are present in the software (Aspen HYSYS) based on the conservation principles. The solution procedure along with the algorithms were discussed and analyzed

(ii) Use Microsoft Excel to teach Vapor-Liquid-Equilibrium (both Ideal and Non-ideal) calculations to find the vapor and liquid composition in a vaporization/condensation problem involving multi- components.

(iii) Use Microsoft excel to teach kinetic rate parameter estimation, reactor optimization and recycle problems. The evaluation of the kinetic parameters especially for heterogeneous reactions requires non-linear regression. This was simplified by linearizing the rate expression and Multiple-regression was used to estimate the parameters.

11.Students Internship :

Students also undertake internships at renowned institutes and research organizations within India such as, IChE Kolkatta. A large number of students also goes for industry internships. For details.

List of students who have completed internship under IChE Students' Chapter

| Sr No | Name of Student | Class | Name of Course | Duration | Grade |
|-------|--------------------------------|-------|--|--------------------------------|----------------|
| 1 | Krunal Raut | BE | Applications of Matlab and Chemcad | Sept 20,2021- Nov 8, 2021 | A |
| 2 | Mohamed Faiz Riyaz Momin | BE | Domestic and Agriculture Solar Energy: Commissioning to installation | Sept 15,2021-Oct 30,2021 | A |
| 3 | Abhishek Ingale | BE | Application of Matlab and Chemcad | Sept 20,2021- Nov 8, 2021 | A |
| 4 | Mahesh Chavan | BE | Application of Matlab and Chemcad | Sept 20,2021- Nov 8, 2021 | A |
| 5 | Murtuza Charbiwala | BE | Application of Matlab and Chemcad | Sept 20,2021- Nov 8, 2021 | A |
| 6 | Sakshi Deshmane | BE | Application of Matlab and Chemcad | Sept 20,2021- Nov 8, 2021 | B |
| 7 | Ishant Kanchan | TE | Industrial Environmental Pollution Management | July 25, 2021- Sept10, 2021 | A ⁺ |
| | | | Two day ISO Certificate Course on Quality Management System | October 2-3, 2021 | |
| 8 | Ashish Kakade | BE | Chemical Process Technology | July 15, 2021- August 23, 2021 | B ⁺ |
| 9 | Suraj Bandal | BE | Chemical Process Technology | July 15, 2021- August 23, 2021 | B ⁺ |
| 10 | Bhumika Kakade (non member) | BE | Chemical Process Technology | June 10-July 20, 2021 | A ⁺ |
| 11 | Shraddha Darshale (non member) | BE | Chemical Process Technology | June 10-July 20, 2021 | A ⁺ |
| 12 | Tejas Kanade (non member) | BE | Chemical Process Technology | May 08 - June 15, 2021 | A |
| 13 | Kartik Joshi | TE | Big Data and Data | June 19 – July 31, | B ⁺ |

| | | | | | |
|----|----------------------------------|----|-----------------------------------|----------------------------|----|
| | | | Visualization | 2021 | |
| 14 | Ritesh Kolhapure (non member) | BE | Chemical Process Technology | May 08 - June 15, 2021 | A |
| 15 | Sharayu Badhe (non member) | BE | Petroleum Refinery Engineering | July 15 -August 30,2021 | A+ |