

## Best Practice-I

### **Title of the practice:**

Student development through participation in co-curricular activities and value added courses.

### **Objectives of the practice:**

- The initiative aims to involve the engineering students in various co-curricular activities like industry specific training modules, technical competitions and activities and providing them with real-world, hands-on exposure to technology.
- To improve the employability of engineers and reduce the time and resources spent by companies on re-training the graduate engineers.

### **The Context:**

According to the United Nations Development Program's (UNDP) India Skills Report 2018, 1.5 million engineers graduate every year, but only 52% are employable. The report also highlights the fact that engineering courses which are linked with industry or corporate through internship or training usually score high on employability as compared to others. Also, student can learn the technology through the co-curricular activities which are closely related to technical specific domain.

### **The Practice -A:** Ready Engineer

Ready Engineer Program is Tata Technologies CSR initiatives to make engineering graduates industry-ready. Students from 2<sup>nd</sup> and 3<sup>rd</sup> year mechanical engineering discipline are identified for the training under this program. The program imparts application-based training by industry experts in technical domain training, soft skill training, employability assessment and National Programme on Technology Enhanced Learning (NPTEL) courses to meet the future opportunities of Industry 4.0.

NPTEL, KRACKIN and Aspiring Minds have been selected as the implementation partners for this program. NPTEL provides e-learning through digital and video courses in engineering, the sciences, technology, management and humanities. It is a joint initiative by seven Indian Institutes of Technology (IITs) and the Indian Institute of Science (IISc) Bangalore. KRACKIN, a startup based out of the NASSCOM 10000 Startup warehouse in

Bengaluru, is a platform to help improve the industry-readiness of engineering students with timely industry interventions through their web and mobile platforms. Aspiring Minds, a talent assessment organization, helps to enhance soft skill and personality development through credible assessments and training.

**The Practice -B: SAEINDIA BAJA / SUPRA**

It is an intercollegiate design competition for undergraduate and graduate engineering students run by the Society of Automotive Engineers (SAE). A team of 25 students from different branches of engineering are participating for this event. Every year near about 350-400 teams from different engineering colleges of India are participating in this event.

A team of students have to create the virtual design of an all-terrain car at college level and have present it in front of BAJA committee judges (from different automobile companies). After selection of design through the judging panel students have to fabricate the complete car in the college workshop. They have to test it as per different road conditions and does the iteration in the designs for sustain the car for rough conditions.

After that different team from all over the India have to bring their vehicles at event place and also the different types of technical inspection , static and dynamic testing will get done. After passing the entire test at event place finally the teams will appear for final racing.

**Evidence of success:**

- Through the Ready Engineer program, students are undergoing the basis training module.
- Students successfully designed, tested the an all-terrain car and a robot at college level and participated at the competition at national level

**Problems encountered:**

- Students get challenged to reduce the cost of manufacturing which subsequently lead to attain accuracy in operation due to low cost material.
- Students face difficulty to manage the timing apart from routine academic schedule
- Students are mostly facing the problem of team work, designing the vehicle and also the manufacturing it.

- They required the proper training for fabrication work, proper resources of availability of material/ components/ parts/ suppliers.

**Resources required:**

- Around 1000 Sqft area is required with power backup, advanced tools and machines like 3D printing machine, Arena etc.
- A digital computer lab and class room equipped with high speed broadband internet connectivity and a projector and Mechanical design domain softwares for hands on practice.



**Best Practice-II**

**Title of the practice:**

Innovative practices in teaching-learning student learning using Information and Communication Technology (ICT)

**Objectives of the practice:**

- The use of ICT aims to improve the teaching-learning methodology/ pedagogy
- To improve the understanding of students through simulation, animation and virtual laboratories.

**The Context:**

Information and Communication Technology (ICT) in education is the mode of education that uses information and communications technology to support, enhance, and optimise the delivery of information. Worldwide research has shown that ICT can lead to an improved student learning and better teaching methods.

Various ICT Techniques have been implemented at the Institute levels in the teaching learning process. Their specific objectives and practices are mentioned below:

**The Practice- A: Think Pair Share**

Through this activity the thinking capability and the visualization power of a student is tested by providing them a scenario or a problem where the students have to think individually on the solution and later pair with another student to discuss the further possibilities of the solution. Later on each pair share their answers and the discussion is carried in the entire class.

**Objective of Practice:**

1. To build thinking capability of students.
2. To help students visualise, understand and find a solution to engineering problem.

**The Practice:**

To illustrate the Think-Pair-Share technique implemented, a typical example is given below:

ICT Tool – TPS – 20/03/2019

Course Coordinator - Saurabh Kohli

Subject – Power System-1

Class: SY B. Tech (EE)

A Think- Pair- Share activity was conducted in lab session on “Substation Study”. The details of the activity are presented in the form of a ppt in the link below:

<https://drive.google.com/file/d/1CZsFRKZJXS8nX0zrLn3XHe65xpCQa0eP/view?usp=sharing>

The activity included showing a set of pictures of various equipment’s of substation and pairing students to think on the same and finally sharing their opinions on the device or the components shown to the other students.

**Evidence of success:**

- Students were able to identify the components in the substation.
- Students made efforts to identify the devices using the connection logics as visible from the pictures demonstrated.
- Students were later explained the components in details and hence the student were able to understand the line diagram of substation in a sequential manner.



**Students discussing in groups**

**Problems encountered and resources required:**

It was observed that a few weak students were reluctant to involve willingly in discussion, though students involved after encouragement. Another important requirement for this session is availability of internet for gathering information.

### **The Practice- B:** Flipped Classroom

A short video was shared with students before the scheduled class and a small discussion activity was conducted during the actual class. The students found it interesting to put forward their own interpretations regarding the concept being discussed. A quick LBD (Learning By Doing) activity was conducted after the class.

#### **Objectives of Practice:**

- a. To improve grasping power of students.
- b. To provide a quick and elaborate revision of topic.

#### **The Practice:**

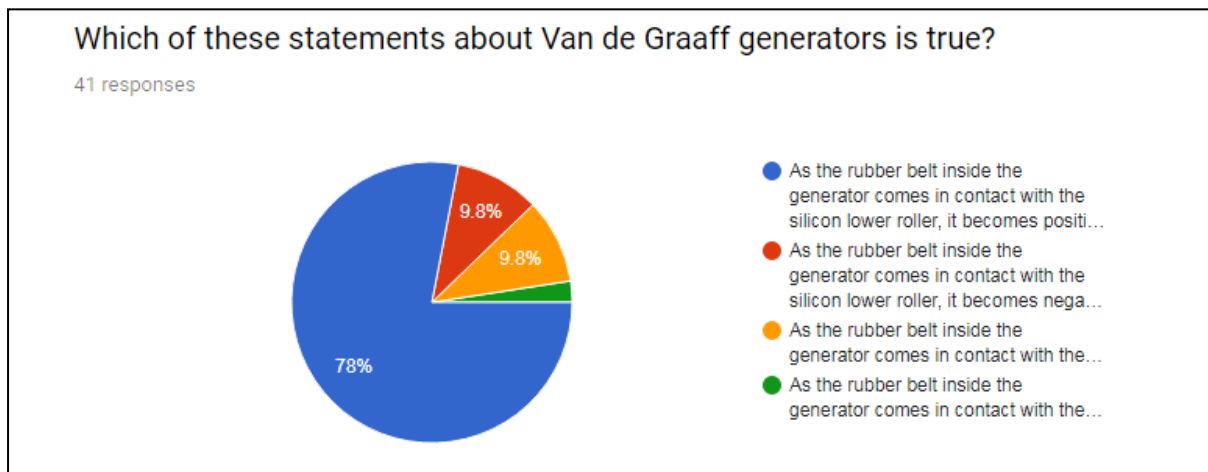
To illustrate the flipped classroom concept implemented, a typical example is given below:

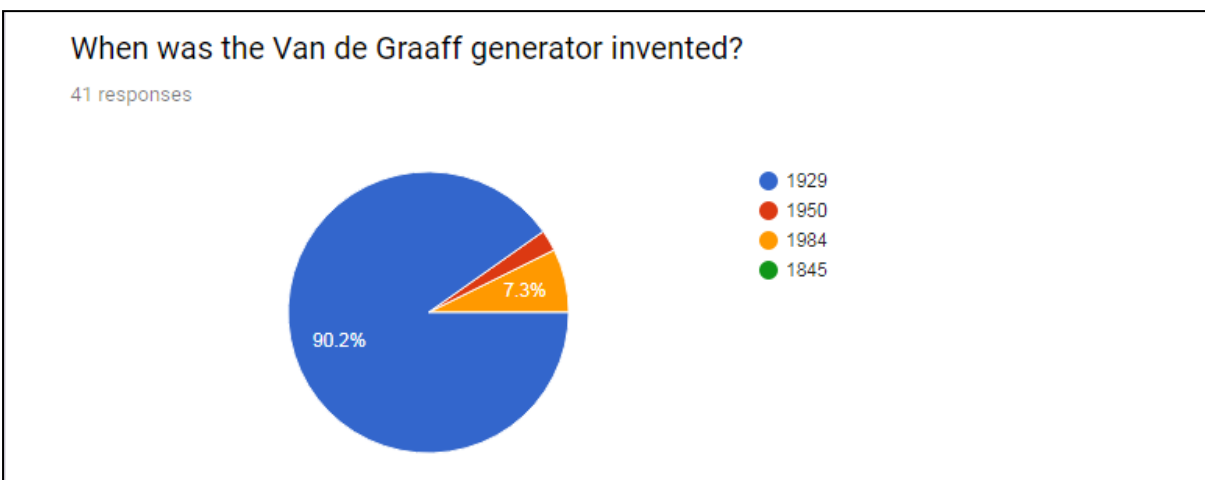
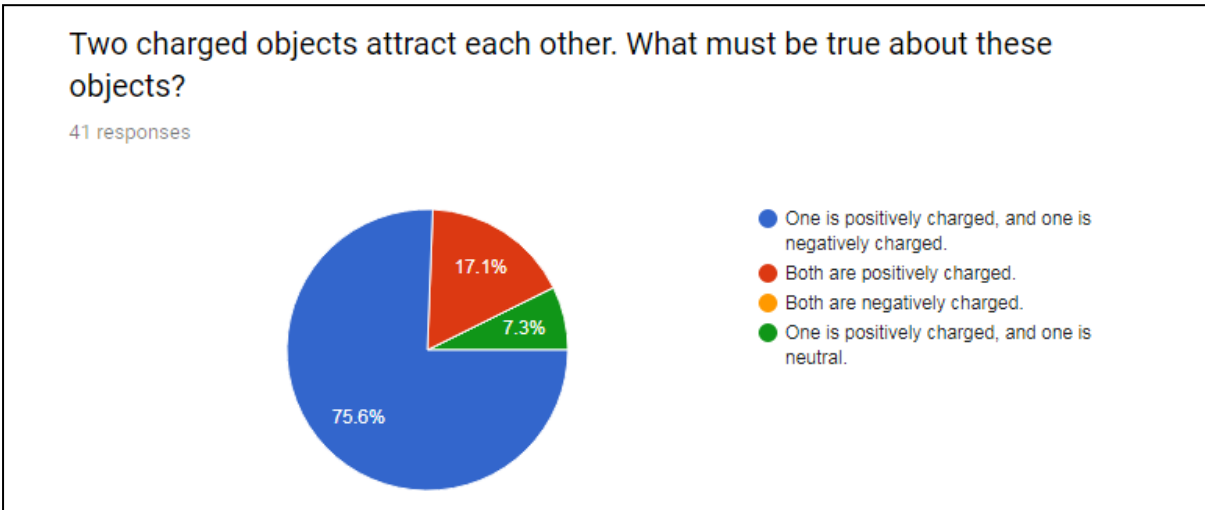
Course Coordinator: Prof. Gauri D. Karanjgaokar

Lecture Date: 6/3/19 Students Strength: 42 , Lecture Topic: Construction & Principle Van De Graaf Generator , Subject: High Voltage Engineering Class: B.E (EEE)

#### **Evidence of Success:**

##### **Evidence of success: Flipped Classroom Activity Analysis**





**Problems encountered and resources required:**

For the success of this activity availability of internet facility for the students at the location of their residence is required. Some students were unable to watch the video before class due to unavailability of internet.

**The Practice- C: NPTEL COURSES**

NPTEL is an online platform developed by MHRD, Govt. of India, which offers online learning Courses for individuals from various fields. This Pedagogy for Online and Blended Teaching Learning Process benefits students and faculties. The online lectures and the discussion forum provides platform to discuss our ideas, doubt related with topic with all the members working with it. The application oriented quizzes and an assignment develops the logical thinking.

**Objectives of Practice:**

- a. To enhance and update faculty knowledge.
- b. To improve student understanding of subject.

**The Practice:**

Faculties and students attend online NPTEL courses on various courses. These courses enhance subject knowledge and helps in improving teaching skills of faculty. Students are involved in the course and they are mentored by faculties. This helps in co-learning of students.

**Evidence of Success:**

Around 50 faculties from the Marathwada Institute of Technology have attended and successfully completed these FDPs during academic session of 2018-19. Some of the faculties have also been awarded the 'Elite' and 'Gold' certification for the same.

**Problems encountered and resources required:**

The NPTEL certification examination requires a registration fees to be paid. The students hesitate to pay this amount and sometimes do not appear for examinations.

**The Practice- D: Virtual Laboratory**

Virtual Labs can be very useful in the teaching particularly in cases where the experiments activities are to be done quickly and do not easily allow observation and safe measurement. The experimental process is very slow and /To enthuse students to conduct experiments by arousing their curiosity. This would help them in learning basic and advanced concepts through remote experimentation complex and not compatible with the teaching time available. The experiments involve risks to health and physical integrity of learners and or the learning activities require modelling

**Objectives of Practice:**

- a. To share costly equipment and resources, which are otherwise available to limited number of users due to constraints on time and geographical distances.
- b. To enthuse students to conduct experiments by arousing their curiosity. This would help them in learning basic



**The Practice:**

Virtual labs are conducted in addition to the experiments included in syllabus. The Institute conducts Virtual Labs in collaboration with IIT Delhi. The Students are provided their login ids and they can perform the experiments. The advantage is a certain experiment can be performed several number of times till the students completely understands the concept.

**Evidence of Success:**

More than 200 students have been benefitted through this Virtual Labs sessions and conduction in AY 2018-19.

