

INTERACTIVE SESSION WITH PROF. UDAY GAITONDE

"The quality of a person's life is in direct proportion to their commitment to excellence, regardless of their chosen field of endeavor"

On the 1st and 3rd of September 2020 , the students of class 11 of Mushtifund Aryaans Higher Secondary School (MAHSS) were Bestowed upon the opportunity to have amongst us the Professor of Mechanical Engineering, Indian Institute of Technology Mumbai, **Mr. Uday Gaitonde**. We would like to express our gratitude to our sir Vyankatesh Prabhudesai for conducting this interactive session.

VPD sir welcomed professor Uday Gaitonde. Sir was absolutely happy to introduce us to the professor. Professor Uday Gaitonde has done BTech in mechanical engineering, IIT Bombay and was the topper of The department. He did his PhD straight from IIT Bombay after the BTech program and completed it in less than 5 years! From 1977 to 1980 professor worked as a Research and Development engineer in Bharat Heavy Electrical limited, Hyderabad. From 1980 to 2020 he Served as a faculty for mechanical engineering at IIT Bombay. He was A full professor for 28 years. Professor has been rewarded with Excellence in Teaching award twice in IIT Bombay. He has held several Key positions in IIT Bombay including Head of Mechanical Department (2002 - 2005), In charge of Alumni Affairs (2000 - 2002), has also Been the organizing vice-chairman of IIT- JEE. Professor is also the Member of many prestigious organization in research councils. Professor has successfully completed many Research and consultancy Projects from the industry. He has also guided many students during their BTech , MTech and Phd programs. Professor has several publications in Top rated international journals.

Getting nostalgic about his childhood, Professor Uday Gaitonde told us That he had to travel to different places due to his father's transfer. They stayed at one place for maximum three years and sometimes his Schooling at one place was as short as 2 months. Professor commented That one common thing in the past was railway travel and this was what Fascinated him into engineering and locomotives. Professor's family Always motivated and supported him. His uncle had asked him to answer JEE and he cleared the examination and got into IIT Bombay in the

Field of mechanical engineering. The amazing campus, excellent faculty, lab facility and superb library helped him take more interest in Studies and become a good engineer. He then completed his BTech and Phd from IIT Bombay and soon worked at BHEL for 3 years. Professor then joined as faculty of IIT Bombay and spent almost 50 Years at IIT Bombay and was proud to say that there was not even a Single day of boredom and he was always happy with all the facilities.

The session turned interesting when Professor Uday Gaitonde Circumstantially answered all the questions put forth by Sir. VPD and Few students.

Q1) After completing BTech at IIT many students prefer To go to US for Masters and PhD program, but what was the reason you Continued to complete research at IIT Bombay itself?

- Professor Uday Gaitonde replied that he too had applied for Admissions but due to no financial support he could not visit the US, so instead of wasting time he decided to start with his work. Till 1975 it was difficult for universities to provide financial Assistance to students coming from foreign countries. Also the other reason was Professor was happy with IIT Bombay and this helped him Concentrate more but at the same time IIT's want each of their Students to get exposed to the outside world; this was the reason Why professor after his PhD didn't directly join as a faculty but Tried applying for many work places. The 3 years of experience in BHEL taught him a lot of skills which helped professor in his Career at IIT.

Q2) IIT's are the best in the world for the Undergraduate Programs, But how good are IIT's for the masters and PhD programs?

- "An institutes particular program depends on how good the Students are and what type of students join. Though the BTech Students are really good they have a foreign attraction and Prefer to go abroad for higher degrees. So consequently, the IIT Do not get students who are already tuned to it which is the Biggest problem. There are few students who have completed Their PhD programs in IIT and are successful today" Professor Replied.

Q3) As a JEE vice chairman what is your experience and how are IIT's Able to maintain the standard of this exam over the years which is Supposed to be the toughest entrance exam in the world?

- Professor commented that, although there is perception in India That JEE is toughest entrance examination in the world some People contest it. Exam papers are always set by a set of IIT Faculty members essentially from the department of physics, Chemistry and mathematics. The IIT's have become famous due To the success story of its Alumni. Because of the highly Quantitative examination it needs to be a sort of selection, seiving Cum ranking test and not an evaluation test like the board Examinations. Since there is an increase in number of candidates The JEE examination has become much more special. There cannot Be any comparison between the level of examination of JEE and Class 10 and 12. The secrecy of JEE Examination is controlled by IIT faculty members. The whole faculty members help in Maintaining the secrecy level. The IIT's have a contract with a Government or a private secure presses.

Q4) Why are subjective questions not included in the JEE examination In the recent years?

- From the past few years there are no subjective questions in the JEE because:

- 1) Rise in the number of papers to be evaluated due to the increase in the number of students answering the examination.
- 2) Time pressure due to the delay in the class 12 results.

During 1990 to 2005 there was a scheme of JEE where there were two Rounds of examination and only the top 100000 candidates Answered the subjective paper. But this led to a financial loss as Everyone appeared for the examination.

Q5) Due to the exponential increase of IITs from 5 to 15 + institutes In short period of time will it dilute the brand IIT?

- Answering to this question, professor replied that any IIT will Take time to establish its reputation. The old IIT's established Their reputation only in the 1970s and 1980s. From 1960 to 2020 There was a tremendous increase in population, literacy rates and Life expectancy; thus to cater to the needs of the students, the Government came up with the plan to set up more IIT's. At Present there are 23 IIT's and 31 NIT's in the country. The main Motive of IIT's is to make sure that the students do well in Their life. The New IIT's are not well equipped with hostel and Campus facilities. But all IIT's whether new or old have gone Through difficult times where initially the students had classes, Practicals at different campus and had to stay at rented flats. It takes 5-6 Years to develop a fully equipped campus. Till date all IIT's have The appropriate number of experienced faculty and they take Very good care of the students.

Q6) How were IIT's evolved over a period of time and was there any Deterioration with increase in the number of seats?

- Professor Gaitonde said that when he joined IIT Bombay as a Student it was just like a simple engineering college. From 1968 Onwards there was a significant MTech and PhD program in the Department. In the first two years of the hostel life the Mtech And PhD students were the caretakers and were very interactive. The quality of teachers was just too good. There was just around 250 faculty members. When Professor shared his notes with his Friends from other engineering colleges he realized that there Was a vast difference in the education system of IIT's and other Colleges. Within IIT's, the emphasis on BTech program has not Subsided but the emphasis on PhD program has increased Tremendously in last 25 years. The IIT's produce around 300 to 500 PhD students every year. Now the faculty members Have exceeded and become 650 which is not required to run only Undergraduate program.
- Also ragging is banned now. Initially ragging helped us to learn a lot From our seniors. But with the advent of internet things changed, the Students have become less gregarious. So The IIT Bombay and Other IIT's have imposed the LAN ban inside hostels at night From 12 to 5 a.m. except in libraries. Hostel life has totally Changed now.

Q7) Since IIT Bombay has announced that the whole semester will be Conducted online, will there be any effect on the engineering education Because of the current pandemic?

- Professor replied that since engineering education requires a lot Of lab exposure this pandemic has significantly affected the coverage of curriculum. This is not sustainable beyond one semester. IIT Bombay Labs had to be shifted to some open space and the smooth Transition is definitely disturbed.

- " Online learning something on the internet is not bad Provided it is in addition to what you do regularly. If you replace Classroom instructions by online classes completely then it is not good. Combination of the two is better than purely either one of the Two" Professor advised.

Q8) What are your views on new education policy?

- Professor Gaitonde mentioned that there are many good policies In the new education policy. The modified education system had Been implemented twice earlier. The good students will have no Issues to cope up with any changes.

Q9) In the recent years, automation and electronics are used in Almost every field. So what is the future of mechanical engineering?

- Answering to this question, Professor said that automation, Related electronics, related artificial intelligence, related data Processing are all add-ons. Automation will make a car journey More comfortable and safe but this automation and additional Electronics does not replace the car mechanics. A mechanical Engineer will not only have to design a good engine, suspension But also design a automated system. The automation gives you Ideas, but the implementation depends on electronic ,civil ,Electrical and mechanical engineering. These basic branches, that is Electrical, mechanical, civil will never fade away. These are value Addition.

"Anything that is done to link natural resources to a good life is Called engineering and people who help in this engineering system are Engineers"

The first split of engineering was:

- 1) Military engineering
- 2) Civil engineering

As time passed, civil engineering applications grew and people Realized there are two reasonably diversified aspects:

- A) Reduce energy produce power using water wheel, steam engines ,Petroleum engines etc.
- B) Build things, structures for the society.

It is very difficult to define what exactly is mechanical engineering does. It is most versatile branch. Every engineering branch will have three parts:

- 1) Study science
- 2) Engineering science
- 3) Applications of science.

Q10) How should students choose their stream which will benefit them In the future?

• Professor replied that there are many students across India who Join IIT Bombay without any particular aim. There are some Students who start with their JEE preparation right from class 8 Without even being aware of their personal health and interest. When it comes to filling up the choices, it depends on the All india rank. Students should take advice from Parents seniors and then make up their mind to choose the right Stream. There are some students who truly follow their heart to Take up a stream irrespective of the rank they secure. Some Students realize their interest after first year at IIT and then Prefer to change their branch. IIT undergraduate course Curriculum is very vast. In mechanical engineering, according to Distribution of courses, core mechanical engineering is less than 50% ,the other courses like basic science social science Humanities are also included which makes studying in IIT very Attractive with broad exposure making IITians very successful.

Q11) Why are IIT's and IISc not listed in top hundred global educational Institutes despite producing world-class engineers?

• The global rating also depends upon the number of international Students and international faculty at an institution. And since we are

Our government institutions , very few foreign students can be admitted And very few can cope up if admitted. Our system is not Comfortable with international faculty. But our institutes are Much ahead in student ability, student placements etc.

Q12) What is the connection between thermodynamics and Superconductivity?

- Professor explained that thermodynamics is the basic science and Is used when there is any energy interactions. The basic principles Of thermodynamics needs to be satisfied while solving any Problem. Superconductivity is the basic aspect of material science. And one of The foundation pillars of material science is thermodynamics.

Q13) What is the role of thermodynamics in the field of mechanical Engineering?

- Professor said that mechanical engineering has about 3 to 4 Major Aspects.
- The 1st aspect of mechanical engineering is to design machines, so For that choosing of the right material is very important.
- Second aspect is that many of the machines evolve energy. They use fuel, power , transmit power etc. And whenever energy is involved thermodynamics plays an important role.
- The third aspect is manufacturing engineering. Whatever is Designed, needs to be manufactured.
- Throwing some light on quantum mechanics Prof. went on to say That quantum physics and quantum mechanics are basic parts of Physics. In mainstream mechanical Engineering there is no great requirement of quantum mechanics But at postgraduate level of high speed aerodynamics, gas Dynamics, statistical dynamics ,microscopic thermodynamics, Quantum mechanics is the major aspect.

Q14) How did you prepare for JEE examination?

- Professor shared his experience by saying that there were very Few coaching classes like Agarwal classes in Mumbai which Provided some additional lectures for JEE preparation. The first Year Inter-science examination was comparatively tougher than Today's 12th boards. The questions for JEE were difficult. But if one

was good in Physics, chemistry and mathematics then one could expect to do Good in the examination. There were some topics for the JEE Exam which were not included for the 1st year inter science final Exam.

Q15) Which branch in physics will have more scope for research in the Next few years?

• Professor commented that where is good research work being Done in almost all branches. All departments have candidates who Have had an excellent Research and superb publications in all Fields.

Q16) How did the girls perform in IIT?

• Professor remarked that the girls do as good as the boys perhaps Even better than them. Currently the number of girls in an IIT is better than it used to be few years ago. There is a new rule in IIT that 10% of students in any Branch has to be girls.

Professor Gaitonde then gave us an motivational advice not to lose Heart if one cannot make it to the IIT since there is always Something much better waiting in ones life.

“ Sometimes good things fall apart, so better things can come together”

Miss. Eashita Prabhudessai then proposed the vote of thanks and Summarized the session. She thanked professor for spending his Invaluable time with the students.

We would like to express our thankfulness to Prof. Uday Gaitonde For providing us with his immense knowledge on IIT which will keep Us motivated until we reach the pinnacle of our ambitions. You are Indeed an inspiring professor!! The webinar ended with the Assurance from sir VPD of live interaction with Prof. Gaitonde Once the pandemic situation improves.

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