Outcome based Pedagogic Principles for Effective Teaching
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Lecture 01
Introduction to Need of 21st Century Education

Okay so good morning. Welcome you in the course of Outcome Based Pedagogic Principle for Effective Teaching. So the word itself said that what kind of pedagogic principle we should use or what kind of teaching-learning process we should use uhh outcome based process we should use so that the teaching-learning is effective.

So this course is will be taught in ten hours, ten hours lecture hours. So there will uhh twenty lectures of half an hour each and this course wil be myself I will take some lectures and some lectures will be taken by Dr. Tamali Bhattacharyya and the course deal with that uhh bloom taxonomy, assessment and evolution, outcome-based curriculum design, accreditation and how uhh how this outcome based curriculum design or pedagogic (())(1:12) kind of pedagogic principle can uhh can increase the effectiveness of the teaching learning and we will discuss how will do this (())(1:21) thing during the course.

Now if you see that what is the outcome of the course? Outcome of the course is that at the end of this whole course, whole ten hour lectures, ten hour ten lecture hours you should able to write the outcome based curriculum objective or (())(1:42) say the outcome base course objective, module objective and unit objective based on the bloom taxonomy. Second outcome is that you should able to develop the test title which will relate to those objectives.

So how to write down the correct test title relate to that objective. Most of the cases if you find examination system we given write a short note on this thing. Why this kind of uhh test title is not correct? We will discuss. What kind of modification is required? We will discuss. So at the end of the course you should able to write the correct test title for the correct objective.

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Next you can plan or you can design your course curriculum which required for NBA or Washington accords accreditation. Not only that you can use that how this can help to teach effectively in the large classroom. So in the large classroom what kind of teaching-learning process I should use so that that teaching is effective we will discuss. Then you should able to design that evaluation method which will or not only that test the, take the test of the students of assign the grade which will reinforce the teaching learning. How that assessment system is help to reinforce the teaching-learning process also we will be discuss.

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Now before I go to the course can you think, what is that yesterday world of education? That means I am saying yesterday means before the Google is came. Today I can search anything in the Google? If I search any key word, Google will give some reply, some material will come out. Any topic you search in the Google then will hundreds of video lectures, hundreds of power point presentation, hundreds of web web contents are available.

So we are not discussing about how to generate the content. So content is available so this is the difference. Yesterday means before the Google has come before those kind of material is freely available or widely available in the net you called it is yesterday education. And that time what is there if we uhh what kind of if you see that you can correlate the this same thing we are also following today so today is change is required. What kind of yesterday education was there?
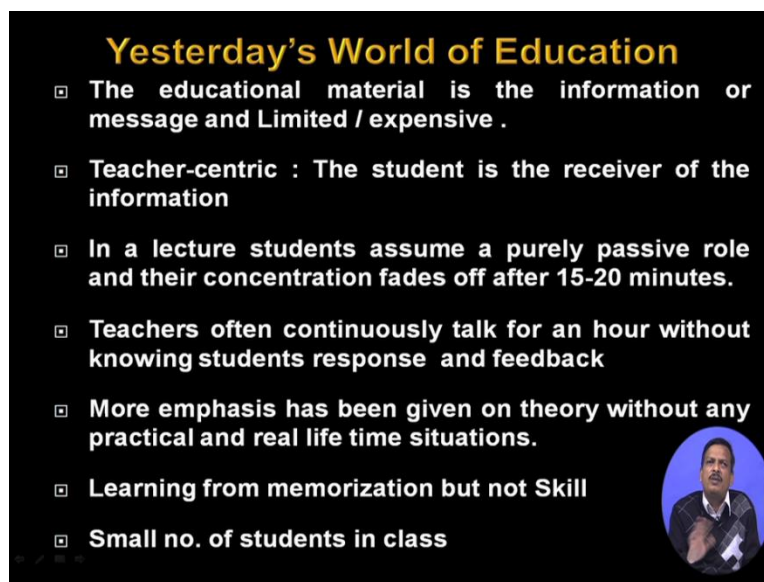
Now in that days the education material is very costly. Student cannot afford to buy a very uhh very you can say the costly book or you can say the this kind of a today (())(4:32) if you ask my daughter she can search anything from the net. Once I said the what is meaning of this word she (())(4:39) just wait I will type in the Google and Google will give the meaning.

So not that that time that kind of material is not available. Information was expensive that's why we that whatever the teacher said we write down the note, so it is teacher (())(4:54). Thus teacher

deliver the information the student and student and student write down as a class note and give exam that kind of things.

But today a teacher if teacher said the okay I will write down some information students say okay this is available in the Google. So why I waste my time to uhh attending in the class so that kind of things is available. So yesterday that is not available that's why student come and write down the teachers teachers a lecture note.

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Next one in the lectures student assume purely passive role student does not have an active role. Teacher came in the class (())(5:28) most of the cases it is happen with some some teacher teaching out that second second order differential equation, he came in the blackboard and write down some problem in the blackboard one corner and try to solve it whole blackboard.

So it is a kind of passive role of the student. There is no interaction, not all cases but some case the interaction is very limited. Teacher often continuously talk for an hour without knowing student response and feedback.
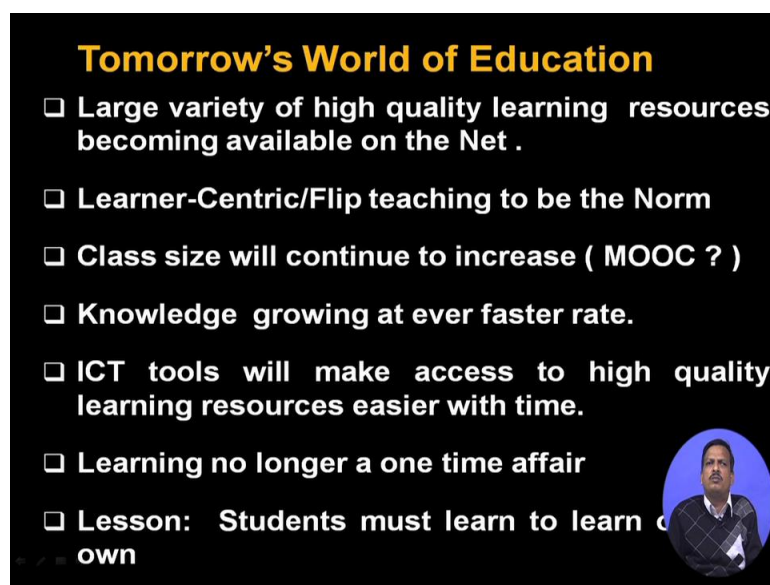
Teacher just deliver the information, teacher thought student learn and teacher got. More emphasis has been given on the theory without any practical and real life time situation not all the cases most of the cases like that's learning for memorization but not skill. Skill is not there

you have just learn from the memorization, and the advantage yesterday education was the that is minimum number of student was very less in the class.

If you say why that earlier education system is so good in spite of all those drawback number of student. If you see number of student in a class maybe thirty, twenty so teachers know, which student is coming in the class which is not coming in the class?

He can read the face while explaining something, while of the student is uhh achieving, responding to that things or not so those kind of facilities available. But if this same practice if I followed today I cannot say that I only take a class for thirty students. It is not possible. It is large number of students.

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So to tomorrow education or today education system large variety of first one is a large variety of high-quality learning resources available in the net. If you say anything it is available in the net, so if you come in the class with the power point presentation and describing that presentation none of the student will interested to receive that information.

Because they already search it and they got it and the information is available in the net then say why I attend this class okay that class I can get the if the get the video lecture better video lecture

from the MIT website. Those professor is given a better lecture than this professor, so why I go to that class?

This is (avail) this is this is the true fact large variety of high quality learning resources is available in the network. Learner centric, flip teaching to be the norm. So if the student is not coming student will come in the class, see this is a this is happening. In most of the cases average attendance rate of across the Institute a decrease.

Most of the student teacher complaining that attendance rate of the class is average below 60%. Then I ask some of the some few student that why you are not interested to attend the class? Then student said me, sir can you give a two very concrete evidence that why should I attend this class?

Some of the class is just if you said the teacher come with the power point presentation, display the presentation, read it in that presentation. So why we will come come to the class? so there is no interaction, no discussion, nothing is there so we have to take the note. So note why I take the note in the class that is available in the Google, better I this learn from the Google is to sitting in the hostels. So why I go the class?

So that means learner centric approach is required, so it is no longer a teacher's centric approach. What I will deliver student will learn this is not mandatory. The student will demand that I want to learn this thing and I am unable to uhh unable to or you can say I have miss conceptions on this problem only. So student will demand that I want this kind of skill from the teachers.

So that is learner centric. So it is not only the information, nobody interested about that how many theorem you have remember, how many law you remember? If I do not have that know how to apply those law law in real life problem. So student will come that yes I have this I want to acquire this skill as a teacher can you suggest me some very good material or can you clarify me what kind of technology is you know here? What kind of methodology is to overcome this kind of situation.

So that means they demand discussing in the class that is learner centric student demand then flip teaching, instead of delivering by the teacher they want that we want discussion on this issue only so that is the flip teaching. Then class size, you cannot restrict the class, today I cannot say

in my uhh in the Institute that okay I will not take than more than thirty student. The institute will say no, it is not happening. You have to take a class of two hundred students.

So if I take a class of two hundred students, what is happening? The two hundred student large class the large classroom, so in the large classroom two hundred students I cannot take the attendance, if I take the attendance of the two hundred student name call uhh it will take time. I cannot remember the face of the students. I cannot read the face of the students whether the students are uhh following the lecture or not?

So if a two hundred student class average attendance is will sixty percent and then some of the student was sitting in the back bench they will do the Facebook because they say the teacher is saying same information that information is available in the Google so don't follow the teacher lecture, what teacher is saying, so you are the since your uhh attendance is carrying five percent mark. Every (())(11:34) by force is coming in the class and doing Facebook in siting in the back bench.

So effectively he is not attending in the class. So that is the main problem how do you teach a large classroom with all students attending with the all students. This is a very challenging problem, so I will define that problem in the next slide and then we will discuss how to overcome this kind of problem.

Knowledge growing at faster rate today tomorrow. Today if you see today I taught something next semester I have to modified because this is knowledge is faster rate it is going. ICT tools how do I used that ICT tool make my teaching is more effective not that power point, yes power point is one kind of ICT tool, so what kind of ICT tools I should use, in what way I should use so that the teaching is become effective.

Next learning is no longer a onetime affair. I have to taught the students learning to learn, how do you taught it. Then student must learn to their own that is the important issue that the a student should learn by their own that habit has to be practices not to spoon feeding, spoon feeding practice is not required because at the end of that program they will be they have learn by themselves so that skill has to be develop. So how to this kind of goes of the dimension of today's education systems.

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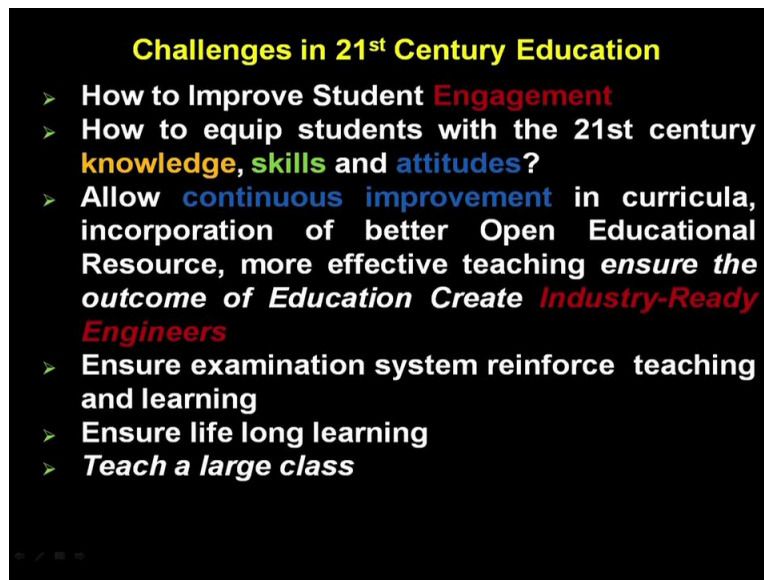
So what are the challenges based on those dimension. The challenges are the how to improve the student engagement I am saying that the one of the major issue in today's education system is the how to improve the student engagement.

If you ask any student that let take subject X any subject if you asked most, of the most of the cases it is true that if you ask any student, how many days you have studied this subject to get a grade A or get a eighty percent mark. His answer will be simply sir, mid semester before mid-semester, five to six days and before end semester five to six days. So why I have taught the subject for six months. If I say lets for the graduate engineer there is eight semester and average engagement of the student is ten days per semester, so if you say four year, eight semester eight into eight ten eighty days.

So there only engage eighty days in the among the uhhh along the four year to get a degree B.Tech degree. So what kind of student engagement we have to talking about. Student claiming that he can get the 80% marks, it is practices among the students many many courses many discipline uhh many Institute it is practices, then a student can say or student can claim that I can get the eighty percent marks of this course by only studying the ten days.

So why I have to taught the student for the four year. That mean something is as serious mistake, some serious mistake we have done so that we have not engaged the student throughout the

semester and we are only student is engage just beginning of the examination because their main agenda is to how to get pass pass the subject and to they will get a grade.

Most of the cases if you see that okay student are just giving the exam and forgot everything. Many cases if you see the grand viva if you ask any students how many subject you have studied just uhh tell the name of the subject. He is not unable able to tell all the name of the subject that means his engagement was very temporary and he gained was so less that he cannot developed anything on that engagement.

But today what is required in industry or today world is required the skill set. How to equip a student we are twenty first century knowledge skill and attitude. How to equip the student with twenty first century knowledge skill and attitude? How they do that? What kind of skill that means if I say I am BE engineer civil then I have to prove, as a BE engineer civil I have this this this skill which other person does not that is why I am a BE engineer in civil.

So any study, any course suppose you said that okay I have attend this course, why I have attend this course to get a certificate, if you attend this course for certificate my advice is do not attend this course. If you not use this knowledge in your practical life that means skill if does not have any skill is acquired by this course then the objective of this course is total zero.

So if you say I study mathematics to pass the exam then why I study mathematics, so I get a certificate and that certificate is that my uhh characteristics that I am civil engineer, I have only a certificate. If you say that same same example is given in skill development program by present Prime Ministers. Then if you say that, you cannot say that I am BE civil that is not your uhh that is not your tagline you can say I have this this this this skill which any other person does not have that's why I am BE in civil engineer.

I can do this this this this things and that differentiate me from the others that's why I have get a degree that BE in civil. See the government has taken initiative MOOC. What is the basic objective of the MOOC? It is not to uhh provide a certificate okay you have get 90% in analog electronics and later on if I ask you can you design a push pull amplifier, he said no sir I studied it but I forgot it after the exam.

That kind of education is not required for twenty first century. So I cannot say I offer a subject on MOOC and okay I have I give you this book subject use uhh follow this subject solve some mathematics and give an exam and get a 90% grade, without any skill, I am not I am not happy that that grade will do anything on you.

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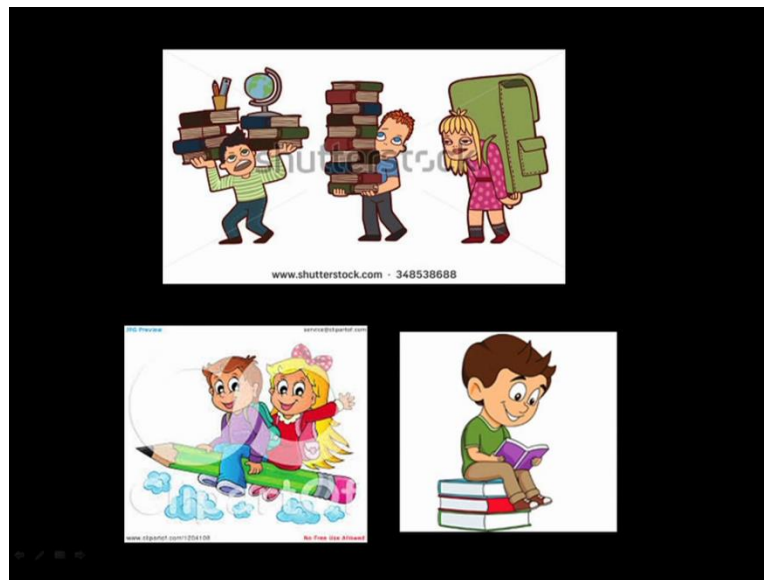
I will show you one philosophy, that I can I will show show you right now that suppose this philosophy if you want, which picture you will be like much much more. Are you carrying the education or education will carry you? If you are a Bengali and if you studied that Tagore's, long back Tagore's said that that we are only carry the education but education are not carrying us. If you see that Tagore writing it is like that "Sikkha ke amra bohon kore chole aleam dahon korite parilam na".

That means we are carrying the education so lot of book, lot of formula, lot of theory, lot of exam, lot of grade card everything is there but in practically I don't have any skill. So that means we are carrying the education in our back. We have studied this Millman Halkias this book. I have studied this uhh top selling this digital communication book, lot of theory, Shannon's work theory I know that all all those kind of theory but one somebody give me a some simple problem I am not able to solve it. Then whole education is totally junk I can say a whole education is totally junk.

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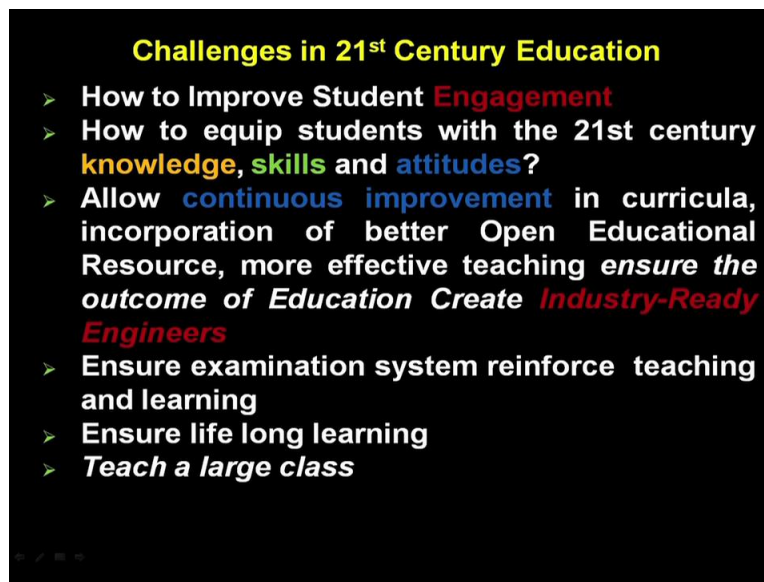
So in that case what I required we have to develop the skill and attitude, as a teacher my responsibility to provide a lectures or to follow a teaching-learning process which can develop the skill and attitude which is required by the 21st century.

Some students are there if you say they got ninety percent marks but if you give them some simple complex problem or a tough attitude is required they break down. So not only the skill, also I required attitude, positive attitude I should not be civil engineer uhh what will happen what will happen what will happen that kind of attitude not required. You require a bold attitude to the prominent skill so I have to equip the students with the bold attitude and prominent skill, not the only knowledge some information, some theory, some grade and some marks.

It is not true so how to do that things which is required for 21 century education. Then continuous improvement in curriculum incorporate of better open educational resources more effective teaching ensure the outcome of education create industry ready engineer.

I am I am talking about the perspective of the technical education, if you say industry say that ohh what about the engineer engineer you are producing are not employable, they does not have any skill, they does not know this things that things so many kinds of objection we are seeing. And as a teacher I said yes they should know the basic basic they should know this basic so everybody offering a subject introduction to the basic of this thing.

So I would say what skill they have acquired which will be used in industry to solve their problem, so I cannot say okay I will teach curriculum which I have prepared in nineteen forty seven and I follow the same curricula today also. I cannot do that because if I do that then industry will say that okay like that. If you see that example given by the (())(23:02) present way same I left can code, he said he is visited a auto mobile uhh engineering education Institute and there also the they have taught a model which is totally absolute.

So why the required that knowledge? So I can say how do I continuously improve my curricula or the skill set which I want to develop all the students with a active collaboration of the industry so that later on the external cannot say okay I can you how the your uhh engineers are not employable your students are does not know anything about this this this thing.

So as per the requirement with the active feedback from the require industry can I modified my curriculum, not only the objective but also the resources, suppose I said, today I taught some some course which is directly relates I can give an example that I I taught a embedded system course okay.

So there is some modern tools are there so that is used by the auto mobile engineers. So now I do not know everything about that tools and the student is pass out. He joined that Institute and uhh industry and find he cannot do anything because he does not know the tools. Now I should get an active feedback from the industry that today embedded system is moving in this this direction. Those are the modern tools which are coming out so they should share this two institute also. So if they share it then as a teacher as a teacher I can use it effectively in my whole lecture and I can claim that my student has a skill set which is required by this industry.

So what industry ready engineer (())(25:02) like is a how do you create the industry ready engineer a and we are uhh inviting some industry person in institute and he give a lectures day one and after the end of the lecture everything is forgot. But we want how do you collaboratively develop a active sharing platform by which as a teacher I should be clearly stated that end of this curriculum they will develop those skill. Now industry can comment okay I require this skill but not this skill then then the Institute jurisdiction which kind of skill set they should want to promote in their students for which purpose.

Very clearly said then I can say every each and every course curriculum must be continuously modifiable, more resources can be added in anytime, more kind of real-life problem can be added by the industry so what kind of teaching-learning process and frame work we should use so the their this can enable. At the end of the this course you can see that IIT Kharagpur propose a framework that framework allow you to do this kind of things.

Next one ensure examination system reinforce teaching and learning. I can ask you one question why there is a evolution system in our education system? So I will I will come her that what is assessment evolution, what kind of evolution use in which which area, that I will later on I will cover it, but today I can ask you that if I say that why we have a end semester exam, mid semester exam, class test, assessment, evolution why that are there?

Why you use this evolution system? The purpose of the evolution system is not to provide grade to the student, this is a buy product. If I say some doctors prescribe you test your blood, then you test the blood then found that you have sugar is hundred and ninety, okay. Sugar is hundred and ninety if I have not take prescribe the medicine to go it down then the loop is not closed.

So if I say I examine a student, student is fail. What the purpose of the examination system? I examine student (())(27:53) thirty five percent is the pass mark, he got a pass. Think about this kind of situation, a student got a thirty five marks in a examination that means he only know the thirty know means which the knowledge knowledge. He has knowledge or wisdom about the 35% of the syllabus and he promoted to the next class. So I got an analog electronics I fail or teacher give me pass mark P and I promoted to third year go for VLSI design. So should I that the say that I will better in VLSI design not in analog electronics.

So that means the purpose of the examination system is a not to provide the grade to the student, that may be by product, that is required for distinguish or listing my student in a class that okay this is 90% boy, this is 80% boy, seventy percent boy so purpose of the examination system to find out what kind of skill set they have not acquired, in target I said at the end of the course you have this skill, this skill, this skill, this skill the purpose of the examination system to find out whether the student has acquire those skill or not.

If they have not acquired those skill then I have to find out the method that either there may be a problem in teaching-learning process that what kind of teaching-learning process I have used that

may be problematic. I have to change that, that means reinforce that or the skill which I have defined may be not achievable.

Somebody may have say that in uhh one course the student will able to design a rockets, can I say that in a one course, the student will able to design a rocket? Somebody many of you write an objective. Student will able to design a filter, design a digital filter. Are you think what kind of digital filter of they have able to whole digital filter can be covered in a one may be one module no.

So if you are skill are clearly achievable and in test that and you found that those of the skill student has not acquired then there is a serious problem in your teaching-learning process and if your skill is not achievable whatever the teaching-learning process you follow it cannot be achieved.

So the purpose of the examination system is not to provide the grade to the student only, it is reinforce the teaching-learning. How many how many of the teachers we have after grading the paper, I you forget okay grade is done okay you ABC uhh grade is done and then we destroy the paper. How many of ours are examining the paper and find out what kind of problems student are generally missing and what kind of misconception are there on the students and as a teacher I should analyze those kind of miss conception and then I have thought that what what is the mistake in teaching-learning process.

What is the mistake in my course outcome? Then I have to correct that for the next batch. I am not saying the same batch and I also advise the batch that look those of the problem you have not able to solve though so that means those skill you do not have please acquire those skill before you go to the next class.

I will say I will I will come that I will say that learning is the learner responsibility not the teacher responsibility. Then ensure lifelong learning. One of the main objective in twenty first century education is that I have ensure that learner learn by himself that habit is created that means that kind of skill set is develop. That is a student is able to grab the subject by himself or herself.

That means self-learning ability everything. If you spoon feed I have two I have uhh take a course and I solve some (simi) same problem and same problem come in the exam and I said write a short note on this. If you see that today what is practicing that English on us Calcutta university of I am not saying that Calcutta university lets any Institute English on us this teachers this lecture note this kind of note the prepare note this kind of question this is the note.

Students just remember that things and the end of the exam he give that exam after the exam everything is forgot is it create the self-learning ability? No not at all. So I have to I have to do not spoon feeds the students. If you spoon feed so the the this this is same. I can give an example of three idiot in movie that they this it sharing that okay I I can I can say that uhhh write an essay on this topic and uhh he remember that topic in essay and give the exam that is nothing but the training.

Memories that things and give it after that is forgotten, everything is forgotten. Most of the cases in or if you see B.Tech course if you ask anything in the final year, any first year courses, no sir I forgot it. Why he forgot it because he studied it as a examination system and he only remember for the get the marks. He does not developed any skill set and question paper also does not test the skill skill set only test is memorization ability and that's why he get a 90% marks at the end of that exam he forgot everything.

This does not create ensure the life self-learning ability. So what kind of teaching-learning process we should follow so that it can ensure that the skill set of self-learning ability is developed on that student. Then I have to teach a large class that a huge class three hundred students class, four hundred student class. Now what is a difficulties, if you scientifically analyze the difficulties since there is a four hundred students, whatever that your entrance exam whatever the uhh filter is there. There will be different kinds of learning ability of the different students.
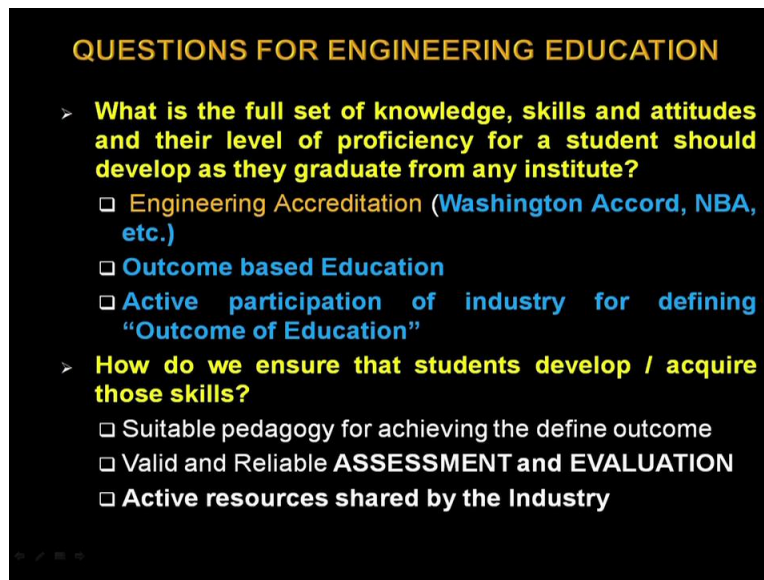
So ability of learning ability of the student to the different or varies from students to students learning style will varies from students to students, learning approaches will varies from students to students, all those things will be taught in this course. Then what what do you mean by learning style, leaning approaches and uhh that learning style, learning approaches and learning ability?

So I have I have four hundred student class. Every student has its own learning style, learning ability and learning approaches. Some students are surface leaner, some students are deep learner some students has a very good ability, some students has a less ability. So all kinds of distribution will be there in the class. Now imagine as a teacher if I want to scatter to each and every student what kind of teaching-learning process I should follow?

It is happening if you see if you come in the class and take a lecture some student will follow some student will do Facebook, some student will say that no this is a boring subject and I have get the pass mark in the subject I have sufficient, forget about the subject. Okay let us take the last year question paper and this teacher has follow this kind of pattern do the exam and pass it. Total wastage of time, total wastage of resources, total wastage of student time, teacher time, institute resources. So what kind of teaching learning process should I follow so that I can ensure that all the four hundred students are engage in my class and all the four hundred student moderately achieve my requirement.

I am not saying that all student will be achieve because learning is the learner responsibility, if learner does not want to learn teacher cannot teach the subject. So that means what I as a teacher but I should very clear that this kind of pedagogy learning pedagogy or learning approaches should scatter to all students and as a teacher I will able to draw attention of every student on the other hand I can say the every students is actively engage in this course throughout the whole semester that is my requirement. How do you do that things?

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Okay next one this I have already discussed. The question for engineering education, what is (())(38:04) lets common said that create industry ready engineer. Nobody define what do you mean by industry ready engineer. Some chemical engineering plants say okay my the student should know that everything in my chemical engineering plant. Some software industries say no no student should very good in C programming, somebody say in Java programming, somebody says in a Pascal programming.

So as a as a educational Institute what I should scatter? Think about the can I not do something that as a institute I can say the my student will develop those of the skill set, I am intended to develop this skill set in my student. Now it is free to industry to modify or to suggest the which are the mistake we have made, what kind of modification they are willing to do it and what kind of resources they want to share us, so that we can develop the desired common skill set. So what kind of methodology we should use to achieve this kind of goal. I will show you a method by which yes this can be achievable.

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So this is the lecture this is the whole lectures principle that we should encourage the students not carrying the education but education should carry them, so how do you do that that is the whole summary of this class that our whole course. How do you taught effectively to the student so that they have develop their skill set, they have develop their attitude, they have also develop their knowledge and by after the they have pass out from this Institute they should reflect those skill set and industry will be happy as a education Institute also happy okay. So next class I will talk about the accreditation.