NBA Accreditation and Teaching – Learning in Engineering (NATE)
Professor N. J. Rao
Department of Electronics Systems Engineering
Indian Institute of Science, Bengaluru
Lec 01
NATE

Greetings and welcome to the course NATE. NATE is NBA Accreditation and Teaching-Learning in Engineering.

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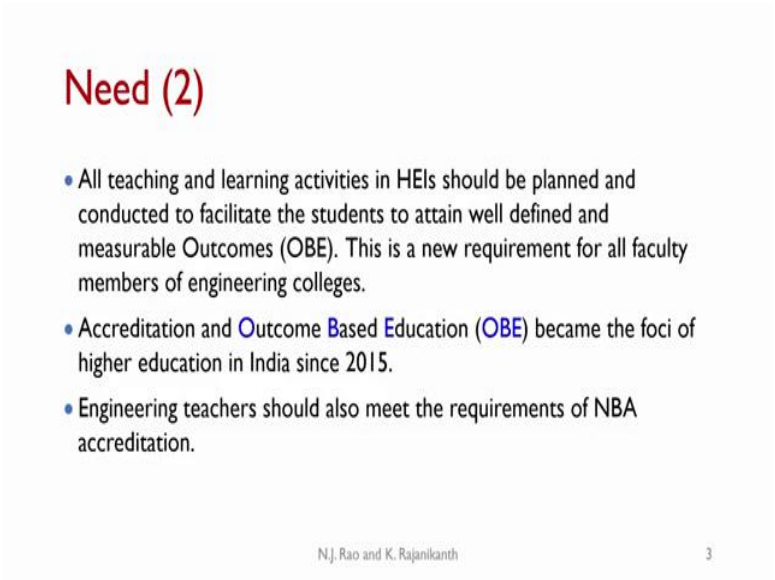

This course will combine both NBA Accreditation and Teaching and Learning as well. Now, the accreditation is a process of quality assurance and improvement undertaken by a designated

agency here it happens to be National Board of Accreditation. You should note that there are several reforms have taken place in the area of higher education in India in the recent past. National Board of Accreditation is an agency responsible for accrediting undergraduate and postgraduate programs in engineering, pharmacy programs, management programs, MCA programs and diploma programs in engineering.

The NBA identify 12 program outcomes that all graduates of UG programs in engineering should attend. The NBA since 2015, requires that all UG programs should demonstrate that graduates of their program have attend these POs, POs are Program Outcomes and are continuously improving their attainment. That is a requirement of the accreditation. At present most of the higher education institutes offering UG programs, UG and PG programs in engineering wants their program to be accredited by the NBA, because of several advantages associated with it.

Even the draft national education policy 2019 requires that all programs and institutions are accredited by 2022. Teachers of engineering colleges should be aware the context in which they are operating and also of the requirements on the accreditation. The programs in engineering are described in terms of what we call learning outcomes. Learning outcomes are what the student should be able to do as a result of learning. These outcomes should be observable and measurable.

Now, all teaching and learning activities in an engineering program should be planned and conducted to attain a set of well-defined outcomes. Teaching to ensure that their student attend this outcomes, is a new requirement from the teachers since 2015. This is now known as outcome based education. Teachers of engineering colleges should now meet the requirements of the NBA accreditation and the outcome based education.

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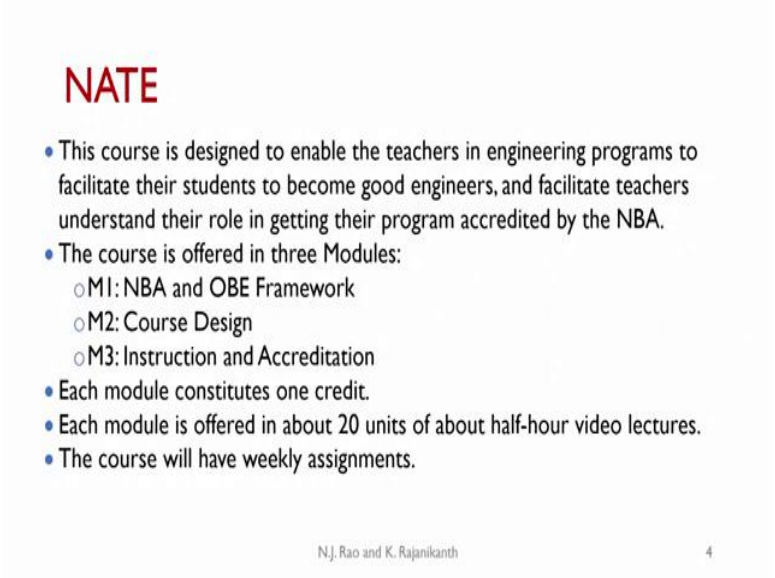

The course NATE is designed to enable the teachers of engineering, teachers in engineering programs to facilitate their students to become good engineers. The courses meant for a teachers of engineering programs and the course aims it facilitating the teachers, so that they can do a better job of their teaching-learning and make their students to become good engineers. And also the course aims to facilitate teachers understand their role in getting their programs accredited by the NBA. That is a purpose of this course.

The course is offered in three modules, it is a three credit course and has three modules as per the requirement of NPTEL. Module 1 presents the NBA and OBE framework in detail. It facilitates, writing outcomes in the framework of revised Bloom's Taxonomy of learning and also presents a method of computing the attainment of outcomes.

Module 2 presents a systematic method of a designing and conducting an engineering course as per ADDIE instructional system design model that facilitates the students to attend stated outcomes. Module 3 presents some methods of instructions, it also discusses the element of all the 10 criteria of self-assessment report of NBA and points out many proactive activities that the teachers can undertake that can lead to better to accreditations scores.

This course is offered as a MOOC through NPTEL. The course is offered as about 60 units of about half-hour videos. Some resource materials will also we made available as per the requirements of NPTEL. There will be weekly assignments and all the assignments and

examination will have only MCQ that is multiple choice questions or multiple selection questions and fill in the blank type of items.

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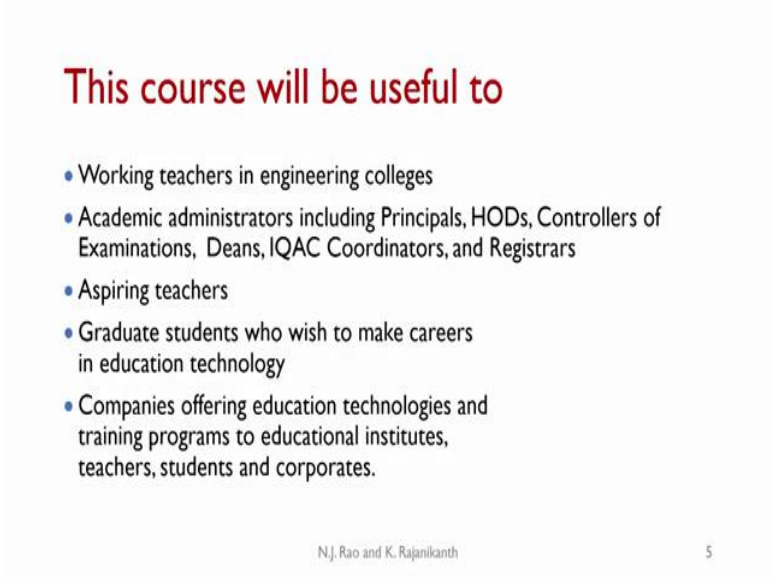

The course will be useful to working teachers in engineering colleges. The main designated audience or attended audience or the working teachers in engineering colleges. And it will also be very useful to academic administrators including principals, HODs, controllers of examination, deans, IQAC coordinators, and registrars, who are really responsible for supervising or overseeing the all the activities related to, related to accreditation as well as constantly improving the quality of learning.

And the course will also be useful to aspiring teachers those who are outside that maybe they have completed their post graduate program and they want to become teachers in engineering colleges, it will also be useful to them. And then some graduate student who wish to make their careers in education technology. They can enrol for this course and get all features of what we call accreditation and design and conducting a course.

And it will also be useful to companies, offering educational technologies and training programs to education institutes, teachers, students and corporates. So, these days we have several companies that are coming to offer such services, this course can also be useful to this companies.

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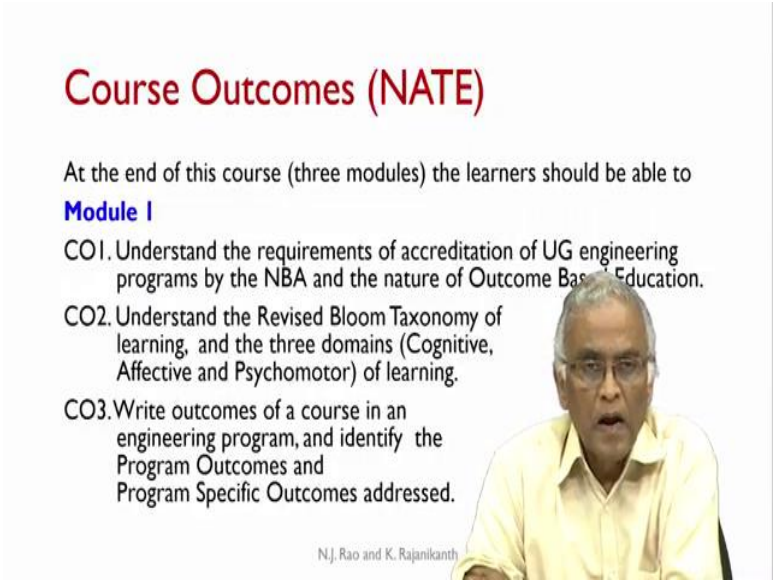

And now let us be clear, as outcome is a basis of all courses. So, we also have outcomes, course outcomes for the course NATE. At the end of this course that is after 3 modules the learner should be able to understand the requirements of accreditation of UG engineering programs by the NBA and the nature of outcome based education.

Next outcome is to understand the revised bloom's taxonomy of learning, and the three domains, of learning which includes cognitive, affective and psychomotor domain. CO3 write outcomes of a course in an engineering program and identify the program outcomes and the programs specific outcomes addressed.

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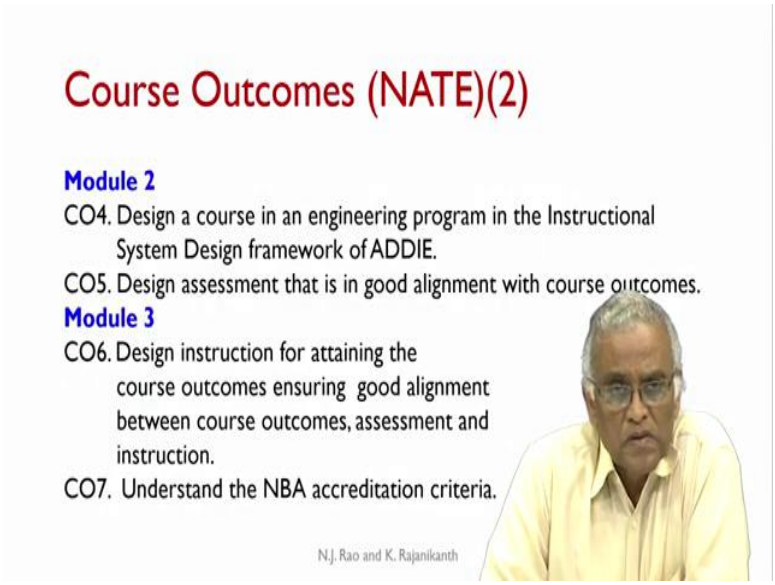

The CO4: Design a course in an engineering program in the instructional system design framework of ADDIE. CO5: Design assessment that is in good alignment with course outcomes. Then in module 3: Design instruction for attending the course outcomes, ensuring good alignment between outcomes, assessment and instruction. And finally CO7: Understand the NBA accreditation criteria.

We bring it to your attention there are several technical words that we have included in this but each one of them will be elaborated in detail when we come to the appropriate point. So, presently please accept like, what is ADDIE? What is program specific outcomes? What is alignment? These are words that are used with a specific meaning in this context.

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As the 4 year BE programme aims at training graduates of 12th standard into engineers, it is necessary to understand what engineer's to do or expected to do after the graduate. This should be the teachers should communicate this in grade detail to their students. Engineers for what do they do? The engineer’s architect, plan, design, develop, manufacture, test, install, operate and maintain technological products and systems.

They will not they are unlikely to do all of them at the same time but at different points of their career engineers are going to be involved with two or more activities of this type. And engineers also provide services using technological products. And some groups of engineers and non-engineers work together to solve socially relevant complex technical problems. Typical

examples are traffic, water, for example, the any issue related climate change or a disaster and so on.

When this complex technical problems can only be solved by groups of engineers and non-engineers working together. And engineers are also required to operate and behave as per well-defined professional and ethical standards. These are the things that engineers do or required to do.

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We want to train our students as good engineers. Who are good engineers? The characteristics of a good engineer considered important by industries, will say industry or organisations who employee our graduates. So, we should really ask these people to say whom do they consider as a good engineers? A survey of this industries shows that practically all of them agree to this main characteristics of good engineers. A good engineer should have some knowledge of engineering science and technologies.

And then they should have ability to solve well defined or ill-defined problems. All the time problems will not be like under the chapter problems, they will all be ill-defined problems that means, one of the activities an engineer has to do is convert an ill-defined problem into a well-defined problem. And good engineers have awareness of customers' needs and market trends. And they have an interest and awareness in all facets of engineering activities.

And more importantly, their ability to work in a team. That is because no engineering activity is done out in a industry by any single person, they always will have to work in a team. And

they should also have ability to document plan and communicate effectively. And lastly, this should have willingness and ability to learn on the job. Because technology changes all the time what you learnt in the undergraduate program will not be sufficient any you have to constantly learn. So, these are the characteristics of good engineers.

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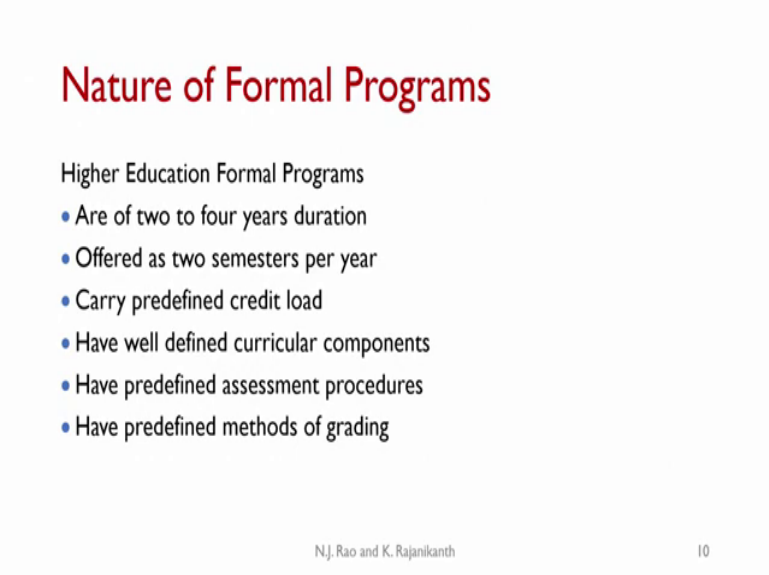

Then, we should also understand, what is the nature of formal programs? Why we need to emphasize? Some people consider teaching and learning is a kind of a, kind of open ended free activity and so on. For example, methods that work when the number of students in a class are small and when the cognitive abilities of the students are very high like you have NIT or IIT students or when you have gifted teachers, that means very highly qualified proven experience in research and teaching and so on, such things do not scale up. You cannot create too many such institutions in a country. When the numbers are large only successful model is a formal program.

It is necessary to understand when nature of this formal programs. Higher education formal programs are of two to four years duration. Offered as two semesters per year. Carry predefined credit load. Have will defined curricular components. Have predefined assessment procedures. And have predefined methods of grading. In India we have further restrictions that do not exist elsewhere in the world. Most of the engineering colleges are non-autonomous.

And a large number of colleges are affiliated to a single university. This is unique to India, nowhere else it exist. Most of the academic activities, therefore as everyone knows are centralised. The centralisation brings its own limitations and also conveniences. This situation

is not likely to change much in the near future despite many people wanting otherwise. On many platforms people will keep saying that we need to all colleges should become autonomous but somehow it does not get translated into increasing the number of autonomous institutions.

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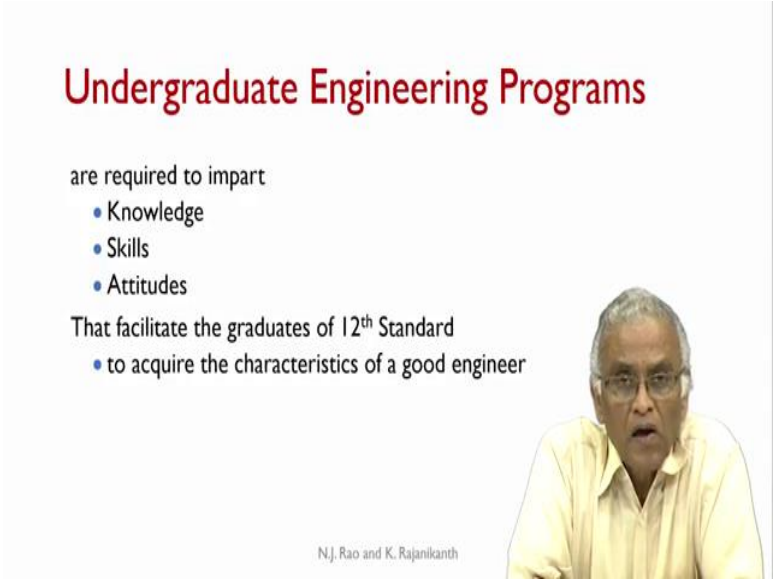

And all undergraduate engineering programs are required two important knowledge, skills and attitudes that facilitate graduates of 12th standards, 12th standard to acquire the characteristics of a good engineer. The boards of studies decide what knowledge, skills, and attitude need to be imparted. These decisions generally are strongly tempered by the experiences of the members of boards of studies. The characteristics of good engineers express this program outcomes by the NBA are the only things that every program should demonstrate their attainment.

So, at present the only thing that is common and is rather imposed you can say or defined or identified by National Board of Accreditation are the twelve program outcomes, which we will be dealing with in grade detail in the later part of this course. Other than that each university or each autonomous institution depending on the experiences or opinions of the members of the boards of studies will define what kind of knowledge and skills and attitude to be imparted in a undergraduate engineering program.

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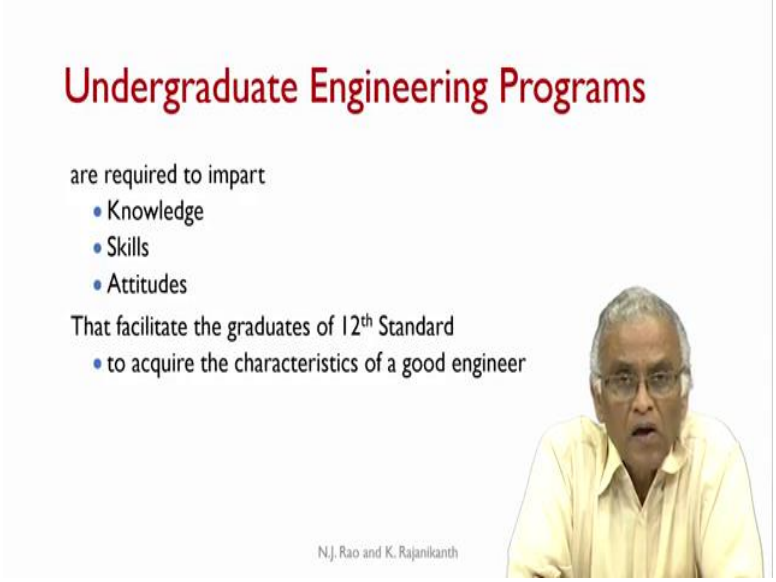

In the next unit, we will be introducing the NBA accreditation process. This will not be done in grade detail but if the purpose of the next unit is to really sensitize to all the teachers to what are the stages or what are the process involved so that they do not feel that they, some kind of a imposition is coming on them. And thank you very much for your attention.