NBA Accredition and Teaching-Learning in Engineering
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Lecture 09
Program Specific Outcomes

Greetings and welcome to module one unit 8 on Programs Specific Outcomes.

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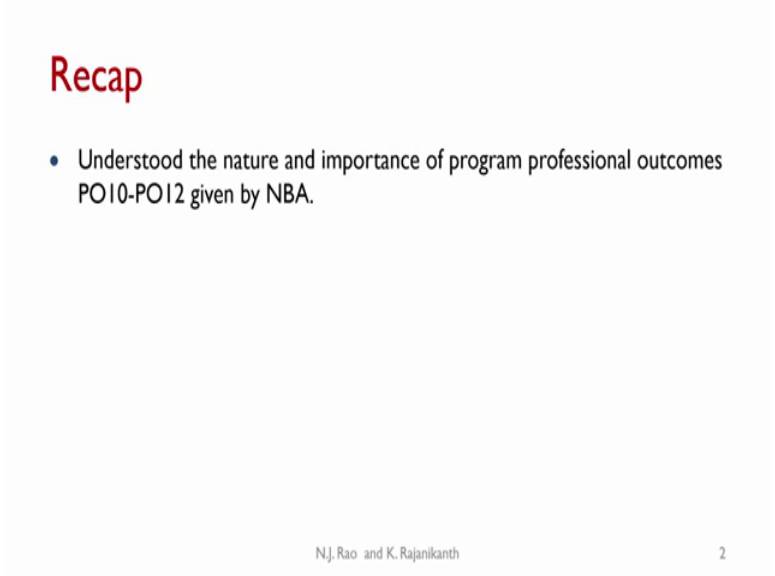

In the previous unit, we understood the nature and importance of program professional outcomes PO10 to PO12 given by NBA.

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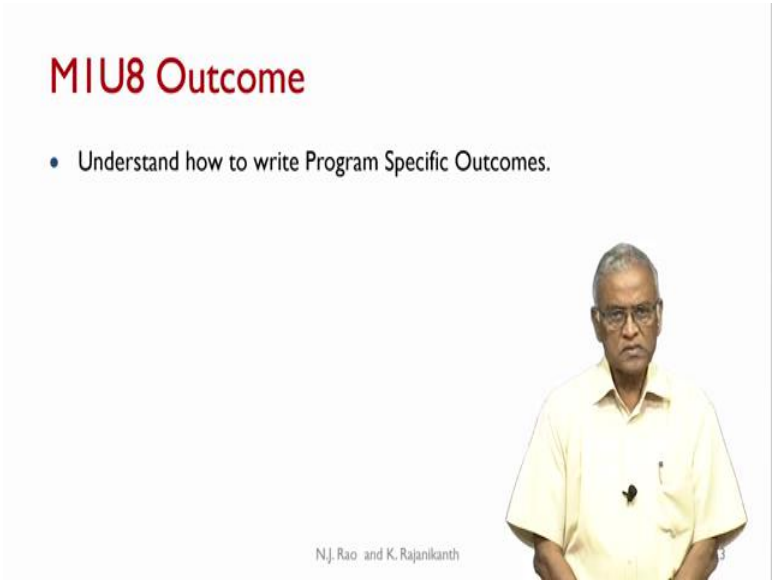

Now, in this unit we try to understand how to write Programs Specific Outcomes.

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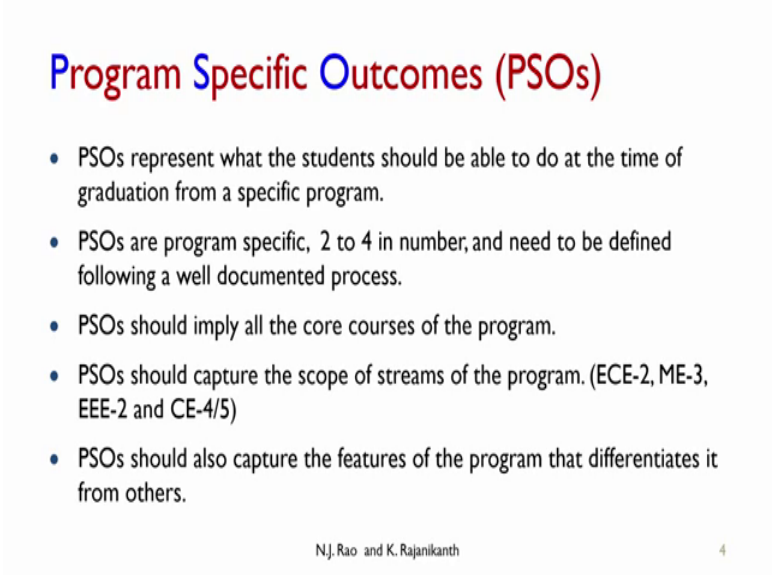

Let us look at what are programs specific outcomes which about which we have already mentioned earlier. PSOs are Programs Specific Outcomes represent what the students should be able to do at the time of graduation from a specific program. So, as you can see, the outcomes at the program level are classified into two.

One is program outcomes, which are discipline nonspecific, and programs specific outcomes which are specific to a given program. The PSOs or programs specific and you limited to two to four in number and they need to be defined following a very documented process. It is not as if one faculty member of a department sits and writes the program outcomes, the program specific outcomes, the department has to follow a well defined or a documented process.

We will see the role of that, when we talk about the criteria of accreditation in the last unit. PSOs should only imply the core courses of the program. There should not directly address any of the electives or the program. And how do we write this PSOs? One convenient way is to look at any program in terms of streams they have. For example, ECE broadly has two strings Electronics and Communication.

Mechanical Engineering has about three streams like you have design manufacture and thermal engineering. Electrical and Electronic Engineering has Electrical and Electronics as two streams. Civil Engineering has somewhere either four streams or five streams. So, one way of writing PSOs is to write one PSO for one string.

So the numbers will differ as, as you can see from two to five, but you have to limit it to a two to four. And in addition, because all programs offered by all institutions are not the same

each institution may have its own. PSOs should also address another feature of the program. All institutions are not, are not the same and the programs offered by them though they may have the same level as Electrical Communication Engineering or mechanical engineering are not necessarily identical.

So, to that extent the PSOs should reflect any specific feature of the program that is offered. Or when a particular department has some specialist faculty in some areas or they have a very specific laboratory with state of the art equipment and you want to consider your program is different from others through this specialties. PSOs can also capture one of those specialties. Of course, writing PSOs still is an art. We will see some examples presently.

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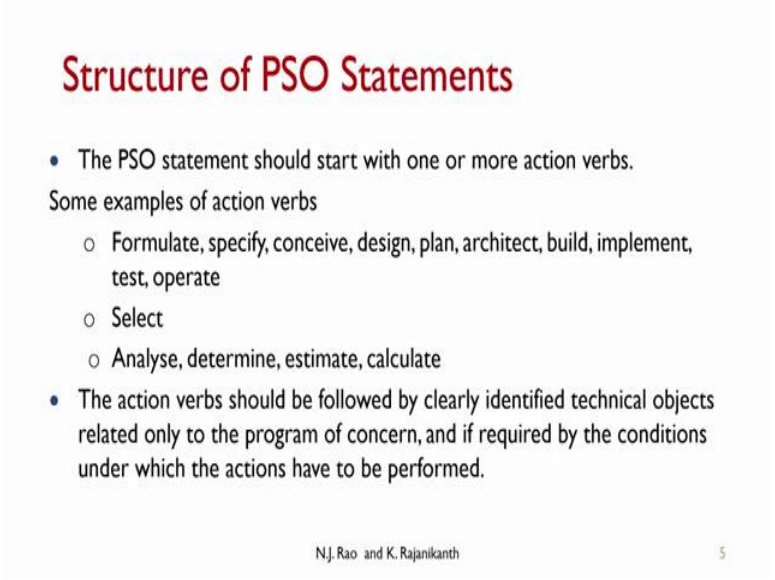

First thing is, the PSOs statement should start with one or more action verbs. We will leave the word action verb right now as it is, but more will be elaborated in the following units. Some examples of action verbs, action that means, what does an engineer do? Like as you have seen already from the program outcomes, some of these action verbs are formulate, specify, conceive, design, plan, architect build, implement, test, operate, select, analyze, determine, estimate, calculate like that you can add some more action verbs if you wish to.

And what happens this action verb, initially you will have one or more action verbs, these should be followed by clearly identified technical objects related only to the program of concern. And if you want to add some kind of condition can be added to the statement. So, that under these conditions, the proposed actions have to be performed. That how, the PSOs statements are written.

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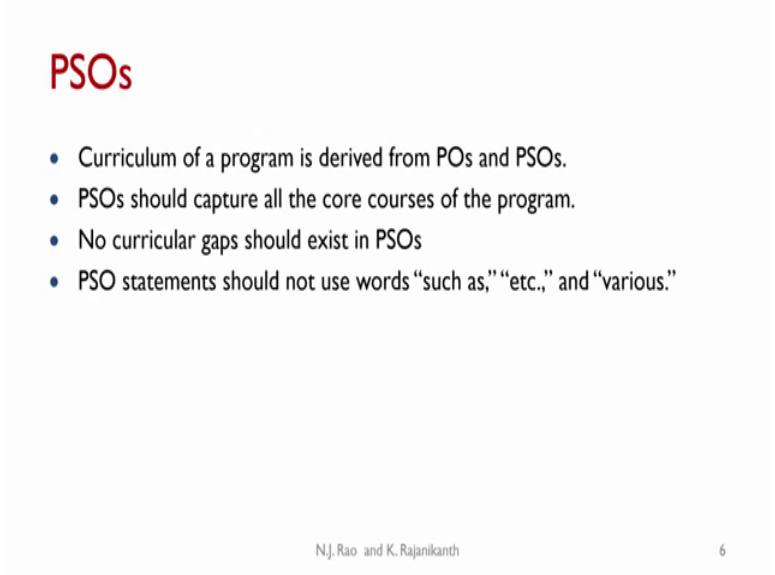

Now, one thing is when you are designing a curriculum, you start with what do you call vision and mission of the department. You write your program educational objectives, program outcomes are given by NBA, then PSOs are written by the department and the curriculum is really comes out of this POs and PSOs. It is derived from that. That means, the sequences you first write PSOs and then identify the courses that you teach.

Of course, at present you already have a program and you are writing PSOs, but if you remember that curriculum of a program is derived from POs and PSOs. The curricular gaps should not be there in PSO because it is supposed to come from PSOs and PSOs should only capture the core courses of the program not the electives. Whether it is open electives or close or the Professional electives, it should not be addressing that this reason is very simple. All students should attain this PSOs and all students will not take the same set of electives.

It is for this reason the PSOs should only capture the core courses and to that extent no curricular gap should exist in a PSOs. That is when you are look at a course you should be able to identify which PSOs that course is addressing. You should not find a situation where you will find it difficult that the very exactly which PSOs your course is addressing. And you should also not use words in writing PSOs like "such as" or like "et cetera," and "various". So, be cautious not to use these words when you write your PSOs statements.

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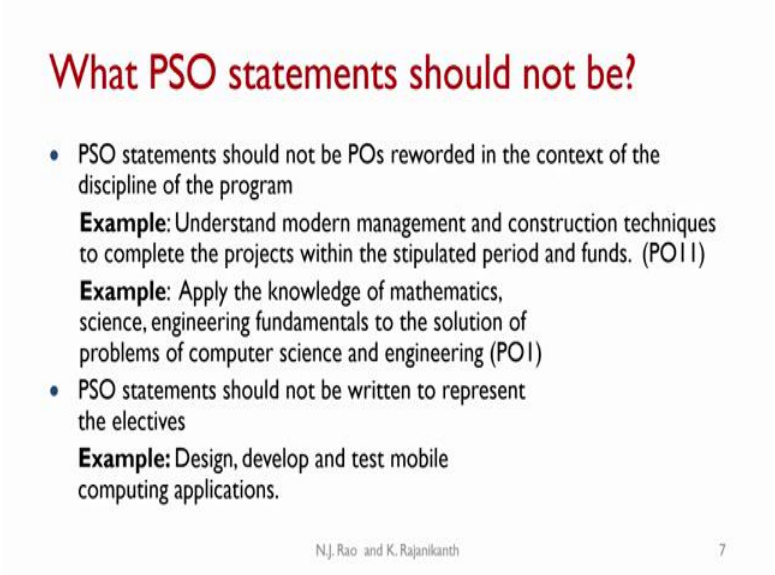

Now, let us look at what PSOs statement should not be? Because from our experience with faculty there is at the, because of inadequate understanding of the role of PSO. You have people have written different kinds of statements. For example, PSO statement should not be POs reworded in the context of discipline of the program.

Let us take a look at an example. Understand modern management and construction techniques to complete the projects within this stipulated period and funds. So, when you look at it when you look at PO11 which is discipline nonspecific, here the construction techniques were added to that. So, that means essentially you are rewording PO11 in terms of civil engineering that is not accepted.

Similarly, another example, apply the mathematic, apply the knowledge of mathematics science engineering fundamentals to the solution of problems of computer science and engineering. That is essentially PO1 restated in the context of computer science and engineering, which is also not a proper PSO statement. Another one, PSO statement should not be written to represent electives that we have already stated.

For example, some people have written design, develop, and test mobile computing application. That is just one elective. One of the reasons also given they say in that department on students, students take this course, but it is officially declared as elective by the program. So, to that extent, even if all students take, elective should not get mentioned as a PSO as a PSO.

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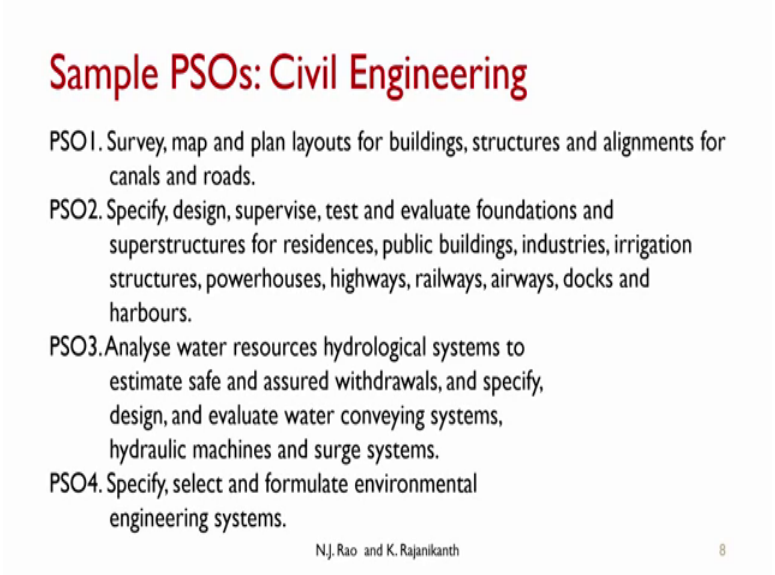

Now, let us look at some sample PSOs, survey, map and plan layouts for building structures and alignments for canals and roads. Specify design supervised test and evaluate foundations and super structures for residences, public buildings, industries, irrigation structures, power houses, highways, railways, airways, docks and harbors. Analyzed water resources hydrological systems to estimate safe and assured withdrawals, and specify design, and evaluate water conveying systems, hydraulic machines and surge systems.

Specify, select and formulate environmental engineering systems. Now, that it is a fairly well written for a particular program now your program may not be addressing all the other elements in this. For example, in PSO2 part you may not be looking at foundations for powerhouses or railways airways and so on, if you are not modify that. So our suggestion is for civil engineering, you can start with these four PSOs and work from there, modify it from here. It makes it easier.

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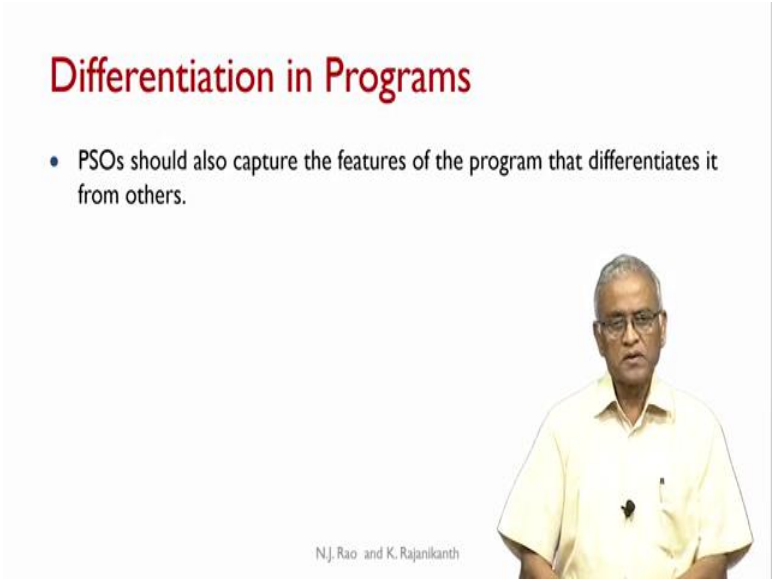

Another thing we would like to point out PSOs should also capture the features of the program that differentiates it from others. The reason we have explained, you may have some special laboratories and faculty with some special, with particular specializations are because of the local industry, you may be you may have reworked your curriculum to suit the requirements of the nearby or local industries. So, they should be captured.

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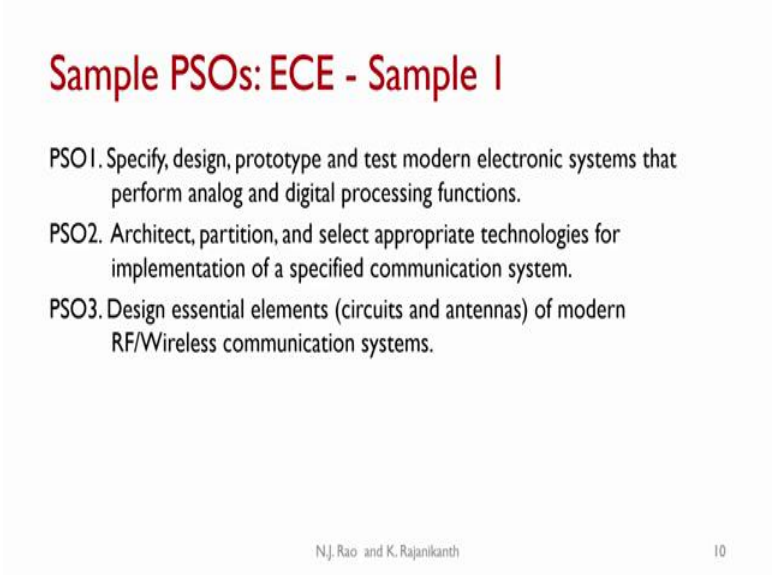

Let us take a, look at some example. Sample PSOs of Electrical Communication Engineering, specified design prototype and test modern electronic systems that perform analog and digital processing functions. As you can see, practically all the electronic courses can come out of this too. Another one architect, partition and select appropriate technologies for

implementation of a specified communication system if you want you can elaborate say wire, wired and wireless communication systems.

And the third one design essential elements circuits and antennas of modern RF wireless communication systems. This as you can see, because of the facilities they have faculty they have this particular program has used this statement to differentiate itself. That means, potentially if a student wants to specialize in these areas, he knows that this particular department has the required facilities to train you in the area of RF and wireless communication systems. So that is one differentiating PSO.

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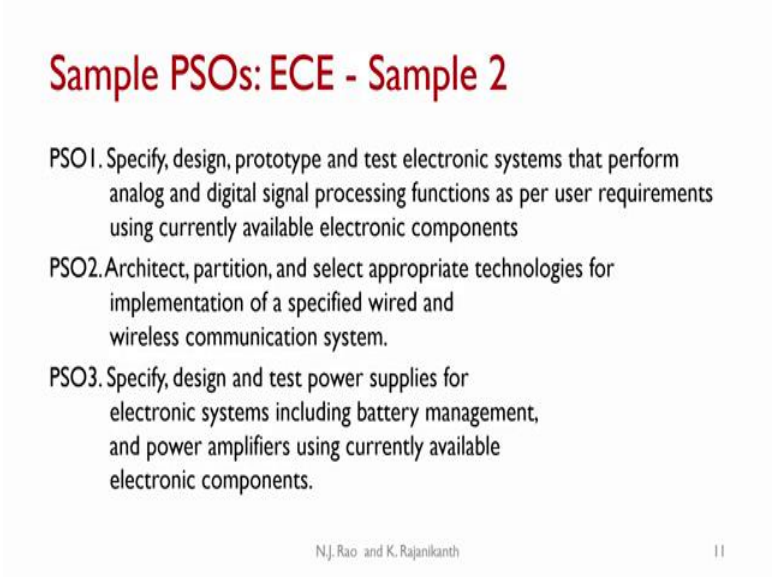

Now, the same ECE, another program has done this specify, design, prototype and test electronic systems that perform analog and digital signal processing functions as per user requirements using currently available electronic components. Now, in what way this PSO1 is different from the previous one. Now, you added some conditions like using currently available electronic components and also you are now emphasizing as per user requirements.

That means, your design or specification should start from by identifying the user requirements for signal processing. The second one architect, partition and select the appropriate technologies for implementation of it specific wired and wireless communication system. So, we added that extra towards wired and wireless communication system here. As you can see, we are not really talking about we are only talking about architecting, partitioning and selecting appropriate technologies.

You are not prototyping a what do you call full fledged wired or wireless communication system. Normally such a thing is not viable in an undergraduate program in most of the colleges. Now, here this, this particular program wants to specialize in power electronics or provide a rather attract students who want to work in a power electronics. So, you added the PSO3 as specified, design and test power supplies for electronic systems including battery management, and power amplifiers using currently available electronic components.

As you can see, this will become a differentiating feature of that particular program. Mind you, these are only sample statements. If you do not like or if you prefer to reword them, you are most welcome to write your own PSO appropriate to your program.

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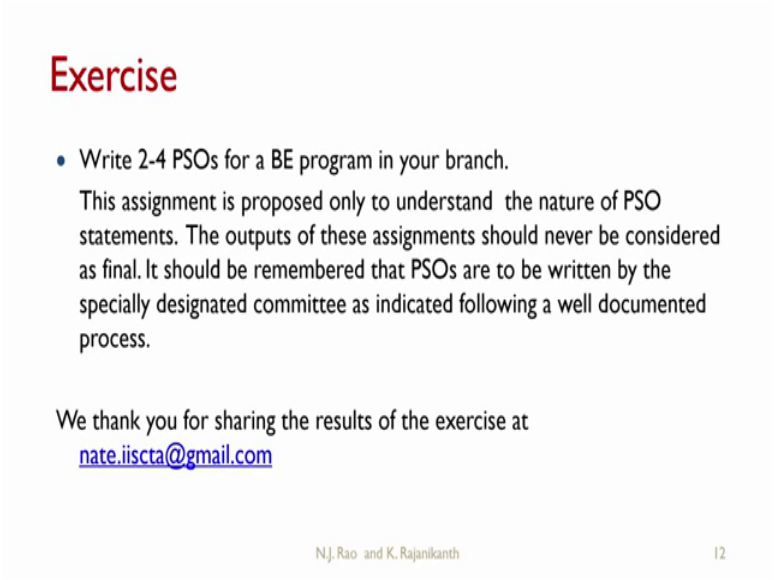

Now, as an exercise, we request you if you can write two to four PSOs for a BE program in your branch. And mind you, when we request you to do this exercise, this assignment is proposed only to understand the nature of PSOs statements. The outputs of these assignments or this exercise should never be considered as final. Because the PSOs are to be written by the specifically designated committee as indicated following well document process. We thank you for sharing the results of your exercise at this particular mail.

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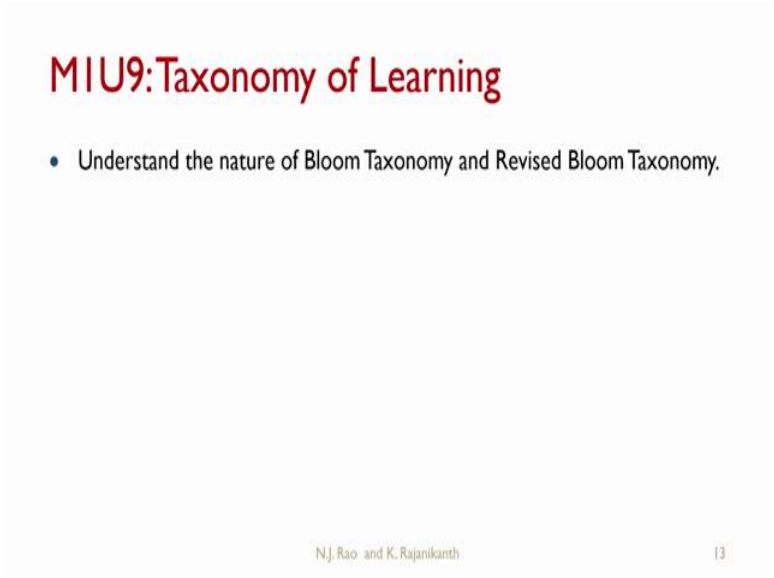

Now, in Module One, unit nine, will be trying to understand the nature of Bloom Taxonomy and Revised Blooms Taxonomy. Thank you very much for your attention. Again see you in the next unit.