NBA Accreditation and
Teaching – Learning in Engineering
(NATE)
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Lecture 25
ADDIE Analysis Phase-2

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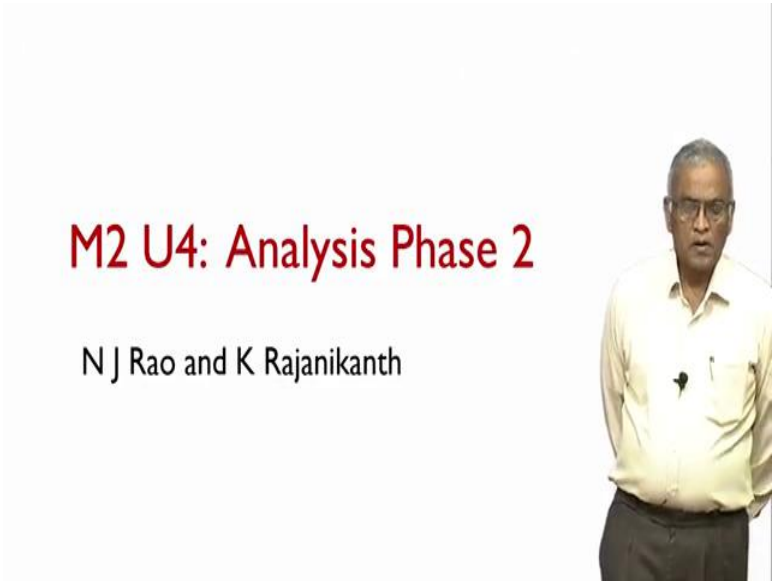

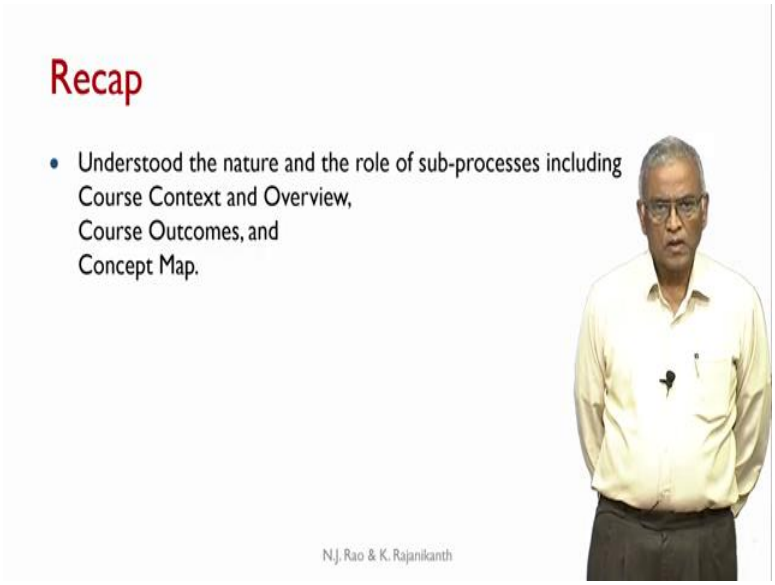

Greetings and welcome to NATE module 2, U-4 on Analysis Phase. In the last unit, we understood the nature and the role of sub-processes analysis including course context and overview, course outcomes and concept map. The 3 issues of the analysis phase are 3 sub-process of the analysis phase, were explored in the previous unit.

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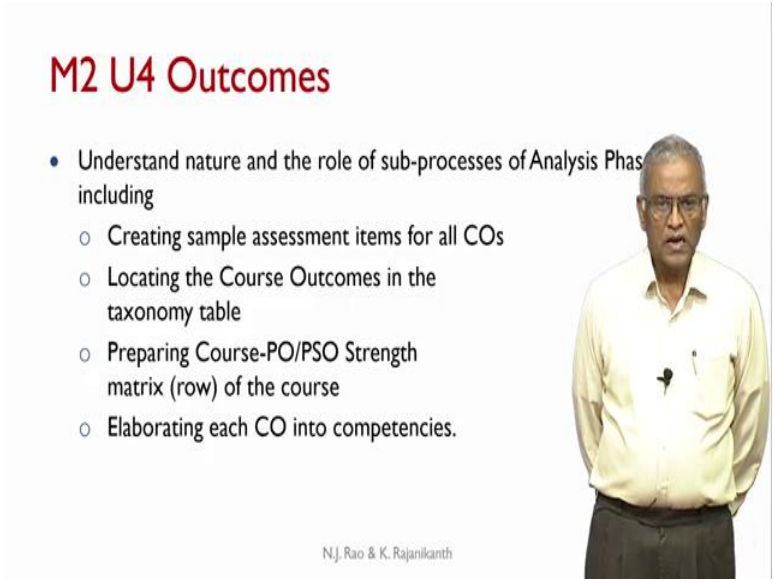

And now, in the current unit, we will look at the remaining sub-processes of analysis phase. These include creating sample assessment items for all COs, locating the course outcomes in the taxonomy table, preparing course PO, PSOs strength matrix of the course and elaborating each CO into competencies. These are the remaining sub-processes of that.

As we said several times in the previous unit, that these sub-processes are not unique. This, we found, in the context of NBA accreditation and OBE fame work. These processes make sense with respect to analysis phase.

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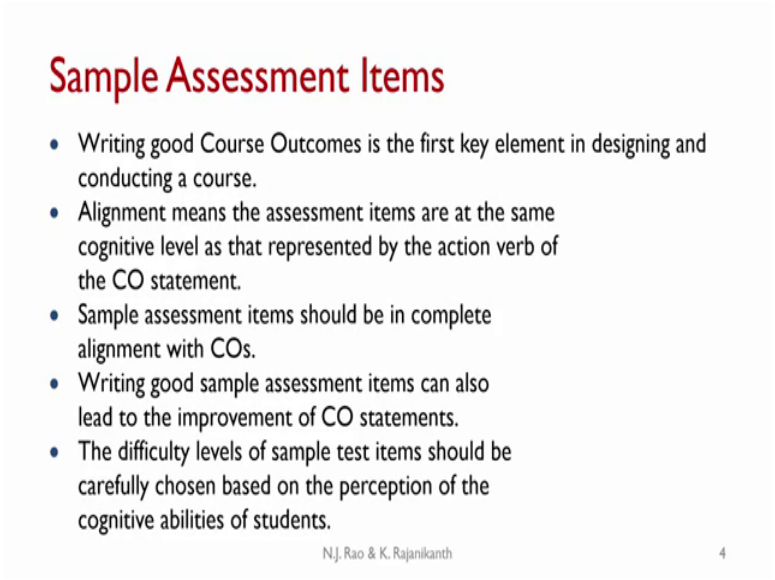

Now, first thing that we want to do, having written COs, it may not completely communicate what is implied in that to the student. For example, if I have, if for example a certain CO is given to us, how do I learn or how do I prepare for whatever assessment that comes subsequently.

So one of the things is having written the course outcomes as the first stage then we talk about the alignment of assessment items with the course outcome. That means I should be able write some assignment items, some or what you call in common language is, questions that need to be solved to demonstrate that the students have attained course outcomes.

So, I also communicate as a teacher to the students. I give a course outcome and I give a sample test items. That means the level of question if a student is able to solve a questions of this category, and we also give provide sample answers as well. And this is a way to be solved, if I can demonstrate that, the student would understand how to exactly prepare to demonstrate that he is attaining the course outcome.

Then, here we talk about alignment. What kind of question should we ask? Here alignment means the assessment items are at the same cognitive level as that represented by the action verb of the course CO statements. There should be in complete alignments with COs. When we write sample assessment items like this, we do not write assessment items which are at a cognitive level lower than that represented by the action verb.

So, this is one thing you should remember, at the level of preparing for the analysis phase, the sample test item should be in complete alignment with the cognitive level of the CO statement. Sometimes when we are designing the sample test items, you may notice somehow the CO is not, you do not feel happy with the way CO statement is written.

In that case, from the sample test items that we have written, we may want to go back and slightly reword our CO statements. That is where the iteration part comes. There need not be any hesitation to go back and correct the CO statements. That is why writing good CO statements requires designing sample test items and if necessary, going back and modifying the CO statements accordingly.

Now, there is another issue, the difficulty levels of sample test items should be carefully chosen, based on the perception of the cognitive abilities of the students. For example, the syllabus or the or the COs of a particular course may look the same as that of an institute where you have, where the what do you call instructional situation is completely different.

The batch of students that you have may be are different. In that case, the difficulty levels of the sample test items should be carefully chosen. Otherwise, you will not be able to achieve the goal where the students will, are able to solve questions of that type.

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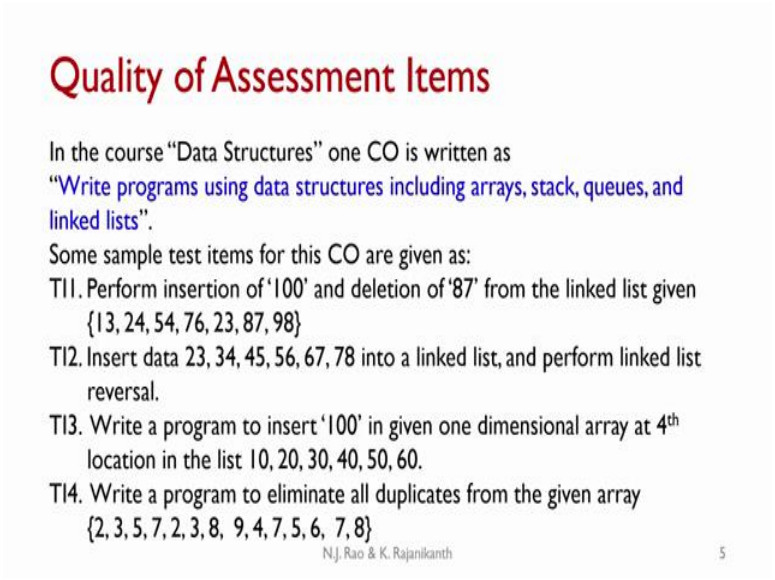

Now let us look at an example. In the course data structure, one CO is written, write programs using data structures including arrays, stack, queues, and linked lists, So, some sample test items are given for this CO are perform insertion of number 100 and deletion of number 87 from the linked list given, which is series of numbers were given.

And when you look at these 4 sample test items, you will find there are 2 sample tests items given with respect to arrays. Both are relevant and are completely acceptable. And 2 test items are given with regard to linked list. But nothing is given with regard to arrays and COs. Sorry, with regard to stacks and queues.

Now, so as you can see, all samples appear to be related to linked lists and arrays and examples of stacks and queues are required. So what happens when we write our sample test items as shown here while they are correct, but they are not complete. That means they do not completely represent the scope of the CO that was written.

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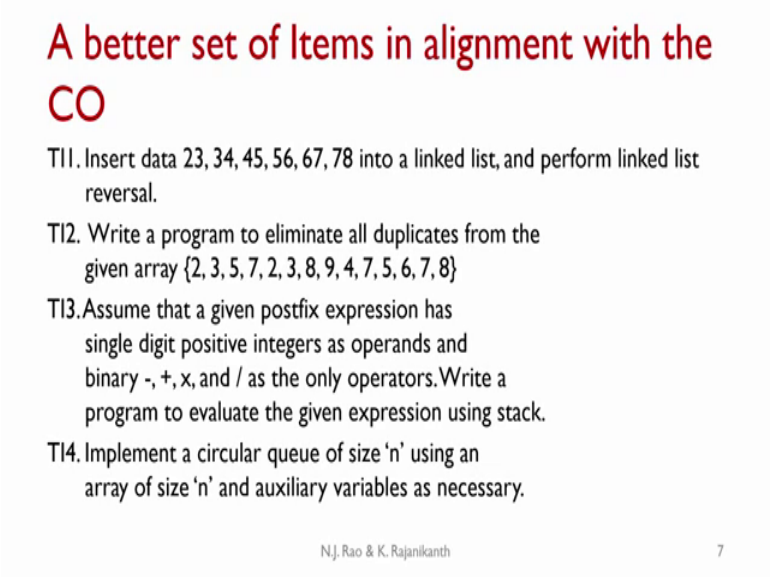

Now let us look at how do I create a better set of items which are in alignment with the CO. Now, as you can see, all of them are, they belong to the same cognitive level apply as that of the CO. Now, here we have one linked, one example of the linked list, first one, and one example from the array and one example that is related to stack and the one sample test item related q, okay.

So these are representative sample test items. There is no actually there need not be any limit on the number of sample test items that you can write. If you want to demonstrate to the students that the variety of questions that can come, that they should get prepared for, you can give more number of samples which actually will represent the scope of the CO as you have it in mind. As a course designer, you have it in mind, okay.

So, sample test items associated with the CO completely communicate to the students, what is it that they should learn and what kind of skills they should acquire with regard to demonstrate the attainment of that CO.

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COs of course Analog Circuits and Systems (ACS) 4:0:1

CO1. Understand analog signal processing functions in present day electronic products. (U-F, C, C&S, PC)

CO2. Design simple signal processing networks using linear and non-linear, passive and active, one-port and two-port electrical networks. (Ap-C, P)

CO3. Understand the simple signal processing applications of passive and active electronic devices. (U-C, P)

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COs of course ACS (2)

CO4: Understand how negative and positive feedback can be used to perform a wide range of signal processing and conversion operations precisely using devices that have parameters sensitive to temperature, voltage and time. (U-C, FDP)

CO5: Design circuits that perform analog linear signal processing functions including amplification, summing, differentiation and integration, and non-linear signal processing functions including log and anti-log amplification, current sensing, rectification and DC voltage regulation using passive and active devices. (Ap-F, C, P, C&S)

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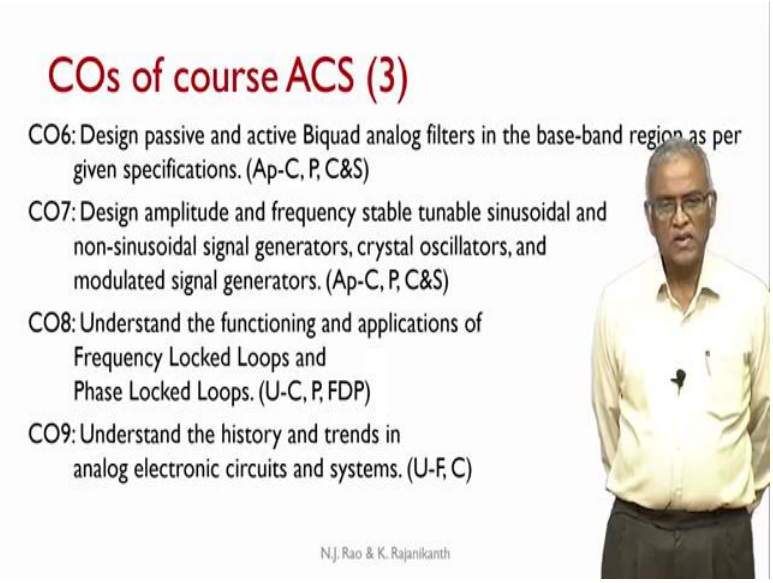

Now, let us look at another, the next issue. Here we look at a course called analog circuits and systems. It is a 4 is to 0 is to 1 that is 4 lecture hours per week and 1 laboratory. So, laboratory and lectures are integrated into 1. And we have written the COs, and each CO here, as we have already tagged them, I am picking only from the those tags, the relevant portions here.

For example, understand analog signal processing functions in present day electronic products. So, the cognitive level is U and the knowledge category is, therefore, these include factual, conceptual, criteria and specifications and practical constraints, okay. These are 4 knowledge categories and the cognitive level is U. Similarly, for all the COs, we have tagged accordingly.

For example, the (second) CO2 has, it belongs to apply conceptual and procedural. And third one has the, it belongs to understand category but it is conceptual and procedural knowledge.

So, you have the other ones listed. There are actually 9 COs in this. So, we want to keep them in the what do you call the taxonomy table. We are calling revised Bloom-Vincenti taxonomy table.

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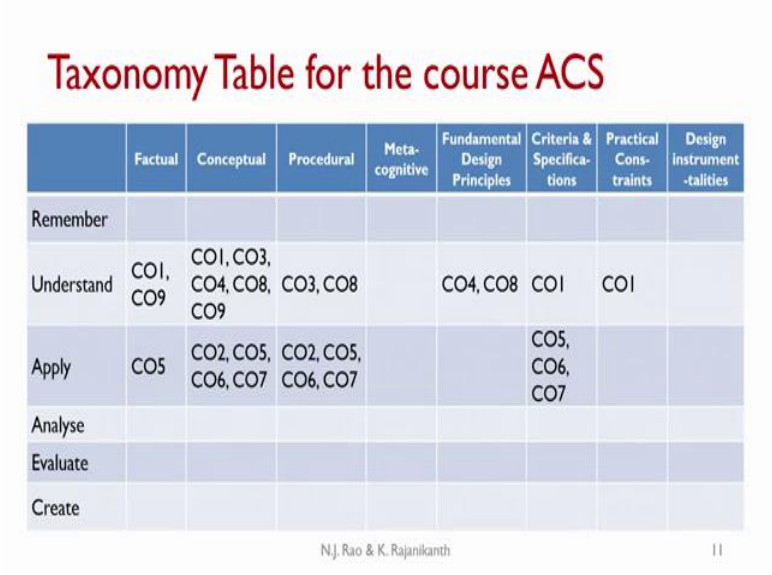

Now, as you can see, these are the cognitive levels, and all this 8 knowledge categories are shown here. And then, as you can see some of the COs will appear more in one knowledge category. For example, a CO 1 will, is appearing in the factual, conceptual, criteria and specifications, here, and also practical constraints. So, one CO is appeared in the 4 cells of the taxonomy table.

Similarly, all the other COs are accordingly mapped, and now you can see how that is you are covering many dimensions of the many knowledge categories. So what happens depending on what how many cells you are in, your instruction will correspondingly depend on that and similarly the kind of sample test items that you are going to write will also differ.

For example, a sample test items can address more than one knowledge category. But when you write sample test items, you have to make sure that your samples are truly addressing all the relevant knowledge categories as well. As you can see, there are only 2 cognitive levels that are applicable but many knowledge categories are relevant in this particular course.

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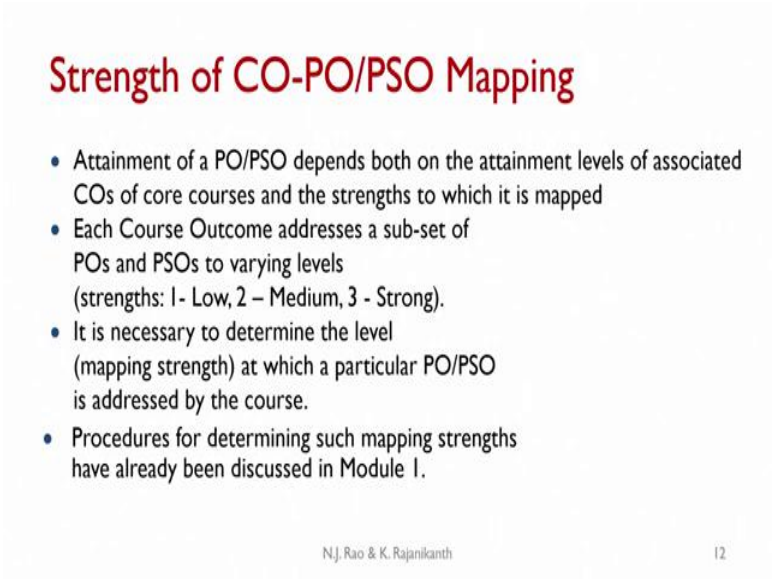

We now look at strength of CO, PSO mapping which we have seen this mapping is required to compute the attainment of POs and PSOs. So, we are only recalling or recapturing what we have done in the module 1. The attainment of a PO, PSO depends both on the attainment levels of associated COs of core courses. And the strength to which it is mapped.

So, each course outcome addresses a subset of POs and PSOs to varying levels and their the strengths are mapped as 1, 2, 3 or low, medium and strong and also you require to determine the level at which a particular PO, PSO is addressed by the course. And that is called mapping strength. We have presented some procedures for determining such mapping strengths in the module 1 okay, we are going to just follow that.

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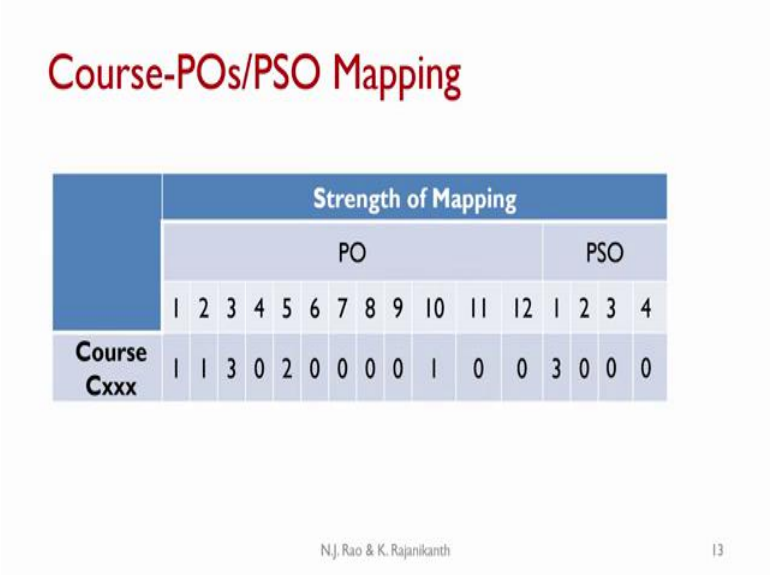

And the same CO, PO, PSO mapping, the strength of mapping is demonstrated here. And in this particular course, you have like this PO 1 is addressed to strength 1. PO 2 is addressed to strength 1 and PO 3 is addressed to strength 3 and so on. You also have to demonstrate to the outside world that when I look at, if somebody asks you show me how you are addressing PO 3 to this strength 3.

We should be able to first demonstrate to the number of sessions that we have and also based on the type of questions that you are asking, in various assessment instruments.

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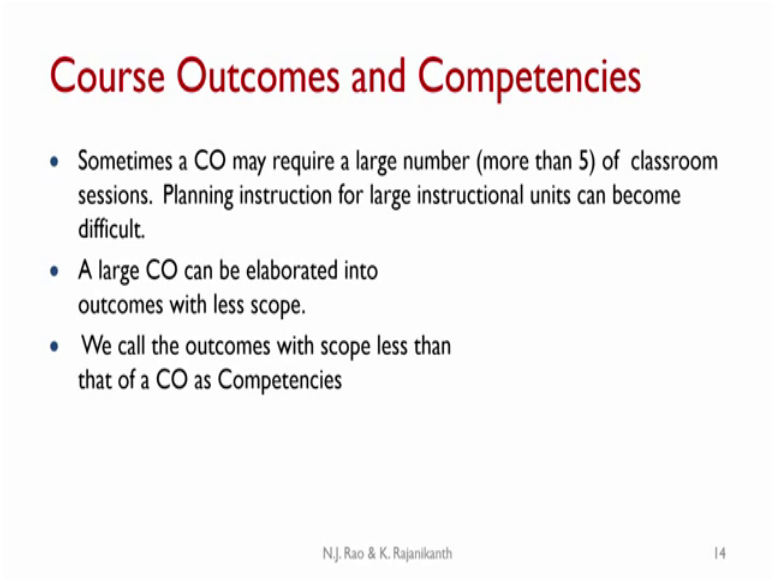

We have another situation. Sometimes the scope of a course outcome can be very large. Like when we map the number of sessions that are required to address a particular CO, we have seen samples going anywhere from 10 up to 15 and so on. That is how it is written. But what happens is, we want it to, we also need to plan an instructional unit.

That means an instructional unit has a very specific goal and if I am associating some 12 classroom sessions with that, it becomes a very large instructional unit. And, it may not be very good to try to integrate so much of material into 1 unit. In such a case, we want to elaborate a given CO into outcomes with less scope, okay. So that my instructional unit now becomes a bit smaller.

So, we call the outcomes with scope less than that of a CO as competencies. The word competency also is nearly synonymous with course outcome. But here for convenience, we are calling the CO, a subset of CO with less scope than the original CO as competencies.

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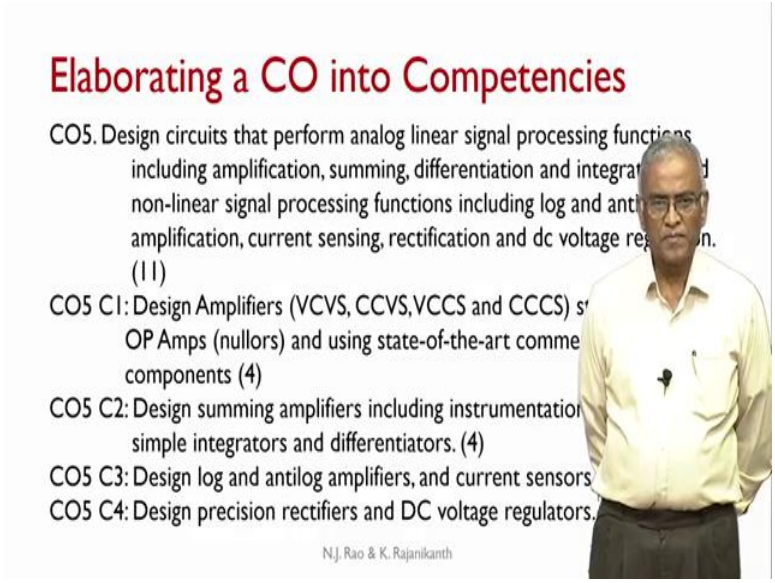

Let us look at a sample. So here, CO 5 of one of the courses that we have written designed circuits that perform analog linear signal processing functions, including amplification, summing, differentiation and integration, and non-linear signal processing functions including log, anti-log amplification, current sensing, rectification and dc voltage regulation.

So very long list. They are all analog linear signal processing functions and some non-linear signal processing functions as well. And the number of sessions that originally planned were 11. So for us to plan our instruction better, we propose to break them into or elaborate them into 4 competencies.

So we are going to label that as CO 5, C 1, CO 5 competency 1, design amplifiers. These are the types of amplifiers we are going to look at VCBS, CCVS, VCCS and CCCS starting with ideal Op-Amps called nullors and using the state of the art commercially available components. This, it was felt, that we can do it in 4 classroom sessions.

And, second one, design summing amplifiers including instrumentation amplifier and simple integrators and differentiators, another 4 sessions. Whereas, competency 3 design log and anti-log amplifiers and current sensors can be done in one session. Whereas C4, design precision rectifiers and DC voltage regulators has two sessions. Then it becomes, now my instructional unit, CO 5, C1 will become one instructional unit that will last for 4 classroom sessions that is the implication of that.

So we elaborate a CO into competencies where required. It does not mean that every CO will have to elaborated into competency. If somebody feels there are 6 sessions that are required, but I want to handle it as a single CO, no need to elaborate into competencies, it is perfectly fine.

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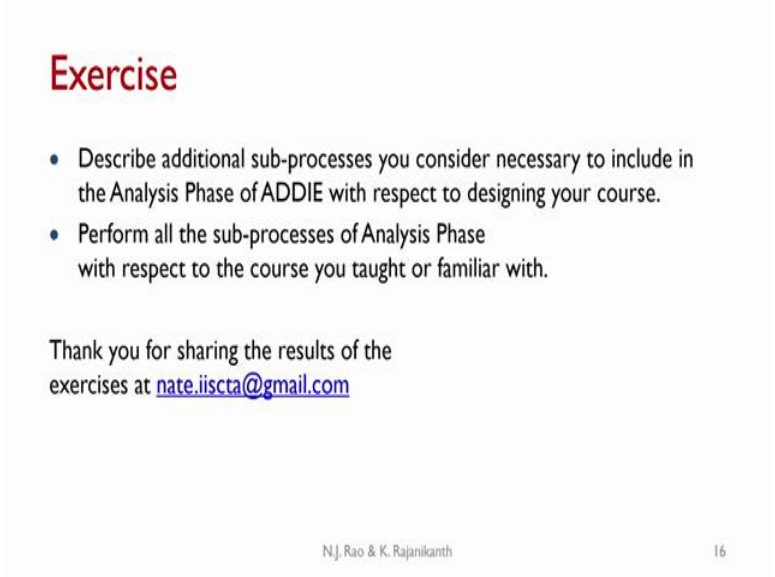

Okay, we request you describe any additional sub-processes you consider necessary to be included in the analysis phase of ADDIE with respect to designing your course. Why we are asking this? Based on the kind of sub-process that we have given, do you feel there anything additional is required with respect to your course. Your course may have some peculiar requirements.

In that case, we would appreciate if you can describe any additional sub-process you think are necessary. And also perform all the sub-process of analysis phase with respect to the course you taught or familiar with. That means we have given you about 8 sub-processes. Can you perform these 8 sub-processes with respect to your course, it is going to take some time.

And also what we are going to do, at least with the, with respect to the context and overview of your course, we will make one sample available to you, which you can consult and write your context and overview in a similar fashion. For others, we have already given you samples in these presentations.

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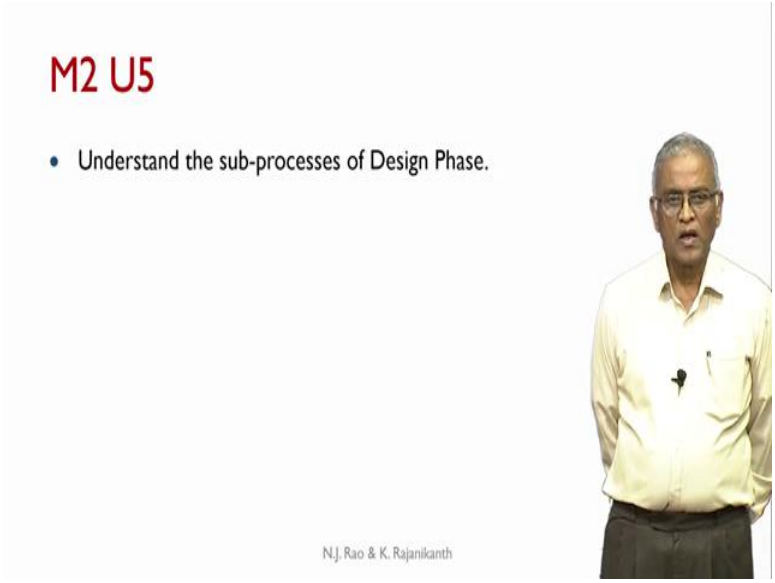

And in the next unit, we try to understand the sub-process of design phase of the ADDIE. We are only talking with respect to the phases of ADDIE. Thank you very much for your attention.