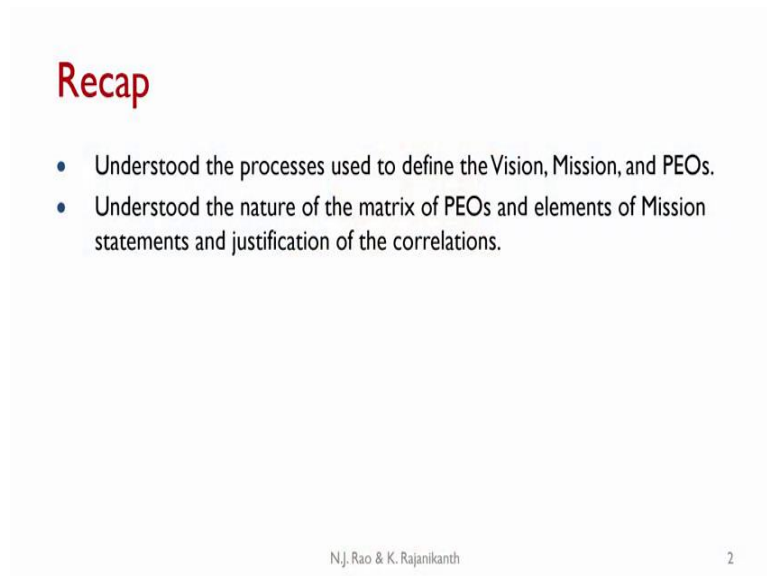


**NBA Accreditation and Teaching – Learning in Engineering (NATE)**  
**Professor K. Rajanikanth**  
**Retired Principal –MSRIT**  
**Indian Institute of Science, Bengaluru**  
**Lecture 51**  
**NBA Criterion 2 Teaching Learning Processes 1**

Greetings, welcome to module three unit eleven. This unit is concerned with criterion two of SAR program curriculum and teaching learning processes.

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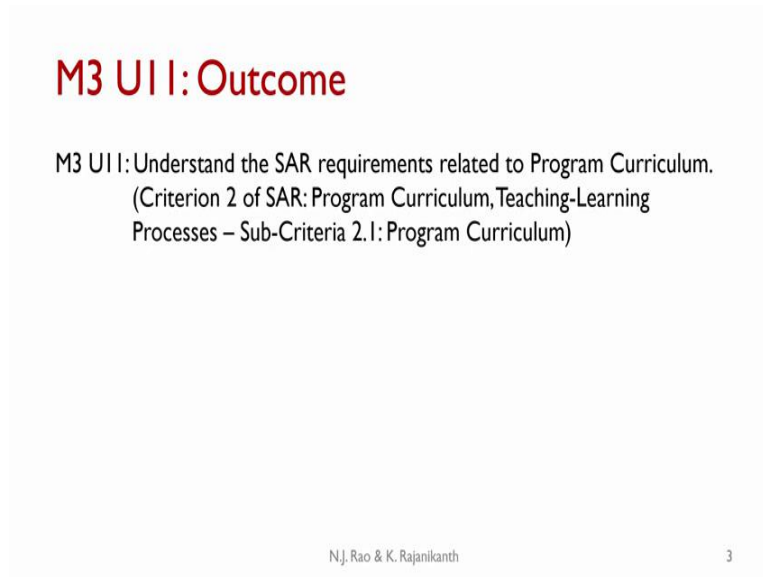
**Recap**

- Understood the processes used to define the Vision, Mission, and PEOs.
- Understood the nature of the matrix of PEOs and elements of Mission statements and justification of the correlations.

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In the last unit, we understood the processes used to define the vision, mission and PEOs. We also looked at the nature of the matrix of PEOs and elements of mission statements and justification of correlations. That was criterion one of SAR.

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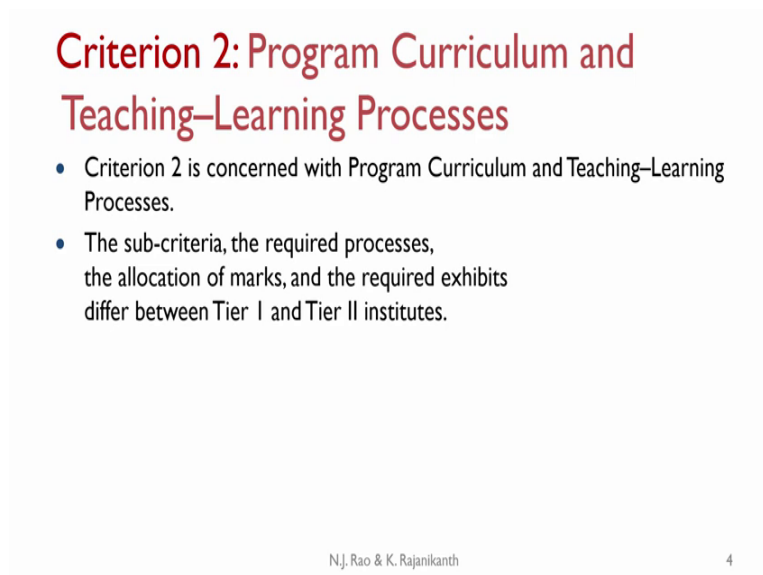
**M3 U1 I: Outcome**

M3 U1 I: Understand the SAR requirements related to Program Curriculum.  
(Criterion 2 of SAR: Program Curriculum, Teaching-Learning Processes – Sub-Criteria 2.1: Program Curriculum)

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The outcome for this unit is understand the SAR requirements related to program curriculum that is criterion two of SAR program curriculum teaching-learning processes. So, in this unit we will be looking at the sub-criterion two point one which is program curriculum. In the next unit we will look at the next sub-criterion which is two point two.

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**Criterion 2: Program Curriculum and Teaching-Learning Processes**

- Criterion 2 is concerned with Program Curriculum and Teaching-Learning Processes.
- The sub-criteria, the required processes, the allocation of marks, and the required exhibits differ between Tier I and Tier II institutes.


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Criterion two is concerned with program curriculum and teaching-learning processes. The sub-criteria the required processes the allocation of the marks and the required exhibits differ between tier one and tier two institutes.

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### Allocation of Marks

Sub-Criterion	Tier I	Tier II
2.1 Program Curriculum	30	20
2.2 Teaching-Learning Processes	70	100
<b>TOTAL</b>	<b>100</b>	<b>120</b>



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This is allocation of the marks, there are two sub-criteria under criterion two. 2.1 program curriculum 2.2 teaching-learning processes for tier one institute it is thirty marks and seventy marks total is hundred marks. For tier two, it is twenty marks and hundred marks totalling hundred and twenty marks.

Before we proceed at outset, it is worth mentioning that NBA requires fairly large amount of detail to be provided by the department under this criterion. It can be quite daunting and taxing task for a department to provide all this details, at least it is going for accreditation for the first time.

However, all the information required is quite logical related to the criteria and it requires to be provided by the department.

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## Sub-Criterion 2.1: Program Curriculum Tier I Institute



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## Sub-Criteria – Allocation of Marks

Sub-Criteria	Marks
2.1.1 State the process for designing the program curriculum	10
2.1.2 Structure of the Curriculum	5
2.1.3 State the components of the curriculum	5
2.1.4 State the process used to identify extent of compliance of the curriculum for attaining the POs and PSOs	10
<b>TOTAL</b>	<b>30</b>



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So, sub-criterion 2.1 program curriculum for tier one institute. There are four sub-criteria state the process for designing the program curriculum, note that for tier one institute the curriculum design is responsibility of the department itself. So, first sub-criterion deals with the process of designing the program curriculum 10 marks.

Structural the curriculum, 5 marks, state the components of curriculum 5 marks, the process used to identify the extent to which the curriculum addresses the POs and PSOs. State the process used to identify extent of complains of curriculum for attaining the POs and PSOs, this has 10 marks. So, a total of 30 marks.

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## Sub-Criterion 2.1.1


State the process for designing the program curriculum.

**Evaluation Guidelines:**

- Process used to demonstrate how the program curriculum is evolved and periodically reviewed considering the POs and PSOs. Also consider the involvement of the Industry.

**Exhibits/Context to be Observed/Assessed:**

- Documentary evidence to indicate the process which demonstrates how the program curriculum is evolved and periodically reviewed considering the POs and PSOs.

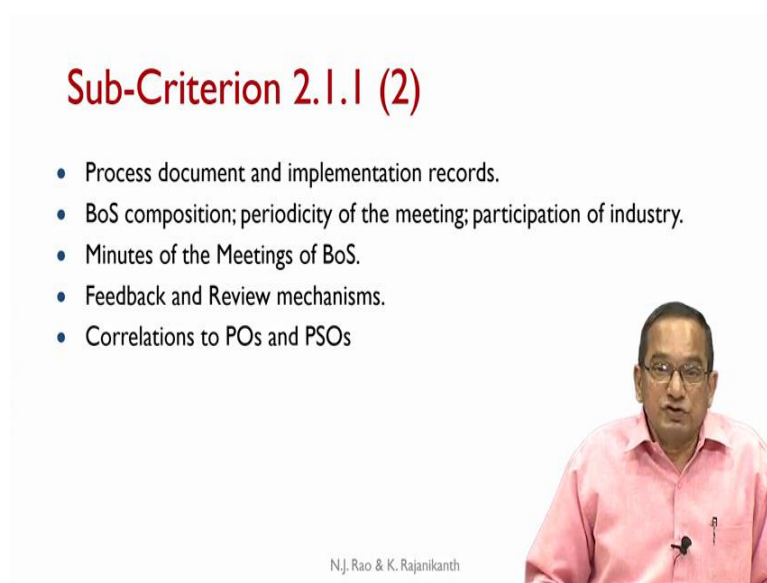


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If you look at the guidelines for this sub-criteria, we will get an understanding of requirements that the department has to meet in order to score well under this criterion. The process for designing the program curriculum, evaluation guidelines would be the process used to demonstrate how the program curriculum is evolved and periodically reviewed considering POs and PSOs. It is also interesting that NBA expects the industry to be involved in the process of formulating the curriculum for a tier one institute.

So, it also looks at the enrolment of the industry. The department must provide documentary evidence to indicate the process which demonstrates how the program curriculum is evolved and periodically reviewed considering POs and PSOs.

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**Sub-Criterion 2.1.1 (2)**

- Process document and implementation records.
- BoS composition; periodicity of the meeting; participation of industry.
- Minutes of the Meetings of BoS.
- Feedback and Review mechanisms.
- Correlations to POs and PSOs

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The department must have a process document and also it must have implementation records. The implementation record must show the active participation of all the stakeholders concern. The process document must specify the composition of the board of studies, the periodicity of the meeting and the inclusion of the industry in deliberations of the board of studies. In fact, board of studies can have one or two members from the industry to ensure that the curriculum matches requirements of industry also.

The department must also provide the minutes of the meetings of board of studies. Feedback and review mechanism must be clearly spelled out in the process document. The curriculum must be mapped to POs and PSOs and the matrix showing the correlation to POs and PSOs must be available.

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## Sub-Criteria 2.1.2 and 2.1.3


2.1.2 Structure of the Curriculum.  
2.1.3 State the components of the curriculum

**Evaluation Guidelines:**

- Expectation in 2.1.2 & 2.1.3 is that the curriculum has well balanced structure & appropriate for a degree program.

**Exhibits/Context to be Observed/Assessed:**

- Documentary Evidence



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The structural curriculum and components of the curriculum indicate to certain extent to quality of curriculum. The expectation of the NBA are captured in the criterion 2.1.2 and 2.1.3 in the SAR. It shows that curriculum must be well balanced it must have a structure that is appropriate for a degree program and documentary evidence must show that the curriculum is balanced and appropriate for a degree program.

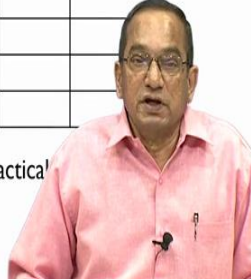
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## Sub-Criteria 2.1.2 and 2.1.3 (2)

Structure of the Curriculum

Course Code	Course Title	Total Number of Contact Hours				Credits
		Lecture (L)	Tutorial (T)	Practical # (P)	Total	
Total						

# Seminars, Project Works may be considered as practicals



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The components of the curriculum must also be clearly shown, so the structure of the curriculum must be presented in the tabular format that is provided in SAR the course code

course title and credits. It also requires the department to specify the total number of contact hours for lecture, tutorials and for practical.

Note that, the relation between the credits load and the number of contact hours is well defined both by AICTE and UGC. If the relationship between the total number of contact hours and the credits as shown in this table differs substantially from the guidelines provided by AICTE it could be a problem. So, department must show the total number of contact hours also and total number of contact hours shown must match with those required for the specified credits structure.

Seminars, project works may be considered as practical for the purpose of entering information into this table.

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### Sub-Criteria 2.1.2 and 2.1.3 (3)

Program curriculum grouping based on course components

Course Component	Curriculum Content (% of total number of credits of the program)	Total number of contact hours	Total number of credits
Basic Sciences			
Engineering Sciences			
Humanities and Social Sciences			
Program Core			
Program Electives			
Open Electives			
Project(s)			
Internships/Seminars			
Any other (please specify)			
<b>Total number of credits</b>			

Then the components of the curriculum must be shown in the tabular format which is shown here and this is what is expected from the department as per the SAR. So, course component can be categorized into basic sciences, engineering sciences, humanities and social sciences, program core, program electives, open elective project or projects, internships, seminars and if there is any other academic component that needs to be specified.

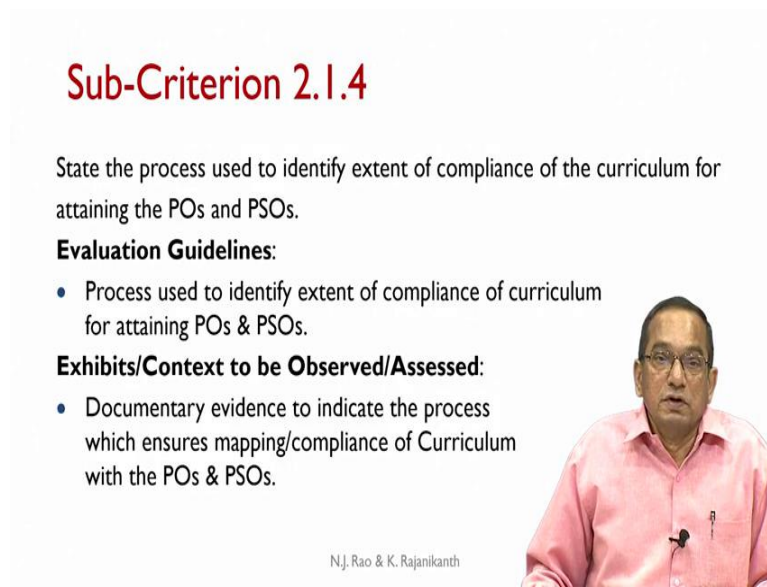
Against each component the percentage of the total number of credits of the program to that component must be mentioned total number of contact hours also must be mentioned and total number of credits must be mentioned. This table is used to assess the quality of the components of the curriculum. Again, guidelines for the curricular components are provided



by AICT also generally university also will have some guidelines regarding the percentages of various curricular components.

The department can evolve these percentages suitably close to guidelines provided by AICT and the university.

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**Sub-Criterion 2.1.4**

State the process used to identify extent of compliance of the curriculum for attaining the POs and PSOs.

**Evaluation Guidelines:**

- Process used to identify extent of compliance of curriculum for attaining POs & PSOs.

**Exhibits/Context to be Observed/Assessed:**

- Documentary evidence to indicate the process which ensures mapping/compliance of Curriculum with the POs & PSOs.

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Sub-criterion 2.1.4 deals with the process used to identify the extent of compliance of the curriculum for attaining the POs and PSOs. What is the capability of the curriculum in terms of addressing the POs specified by NBA and PSOs formulated by department.

The process must clearly show how the mapping is established between curriculum and POs and PSOs and from this mapping the department must be able to determine the extent to which the curriculum will enable the students to attain the POs and PSOs. The documentary evidence must be available to indicate the process which ensures the mapping and compliance of the curriculum with the POs and PSOs.

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## Sub-Criterion 2.1.4 (2)

Process which ensures mapping/compliance of Curriculum with the POs & PSOs:

- Program Articulation Matrix (Sub-Criterion 3.1) depicts the correlation between the courses and the Program Outcomes (POs) & Program Specific Outcomes (PSOs). Column averages indicate the extent to which the curriculum is compliant to the POs and PSOs. A sparse column shows that the corresponding PO/PSO is not adequately addressed by the curriculum.
- Expectations from relevant organizations like AICTE, ACM/IEEE, Industry may also be considered.
- Process document and implementation records must be available.

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There are many different ways of developing a process document for this purpose, one sample is shown here, the program articulation matrix which we will see later comes in sub-criterion 3.1 depicts the correlation between the courses and the POs and PSOs. When we look at that column, regarding a particular PO the different courses which address that PO are all shown there, so if you look at the column average it is a measure of the extent to which the curriculum is compliant to that particular PO.

So, by looking at column averages we can arrive at estimate of the extent to which curriculum is addressing different POs and PSOs. A sparse column shows that the corresponding PO or PSO is not adequately addressed by the curriculum. That would mean that the curriculum is not addressing that particular PO or PSO effectively. Expectation from relevant organizations like AICTE or professional bodies like ACM or IEEE and industry may also be considered in looking at the quality of the curriculum.

The department must have a process document as well as implementation records.

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## Sub-Criterion 2.1: Program Curriculum Tier II Institute

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### Sub-Criteria and Allocation of Marks

Sub-Criteria	Marks
2.1.1 State the process used to identify extent of compliance of the University curriculum for attaining the POs and PSOs; mention the identified curricular gaps, if any	10
2.1.2 State the delivery details of the content beyond the syllabus for the attainment of POs & PSOs	10
TOTAL	20

**Note:** In case all POs & PSOs are being demonstrably met through University Curriculum then 2.1.2 will not be applicable and the weightage of 2.1.1 will be 20.

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The sub-criterion 2.1 program curriculum, but now for a tier two institute. The sub-criteria or state the process used to identify extent of compliance of the university curriculum for attaining the POs and PSOs. Mention the identified curricular gaps if any recall that for tier two institute the curriculum is provided by the university. The department has no role in designing of the curriculum but the department must determine the extent to which the curriculum provided by the university enables the student to attain the POs and PSOs.

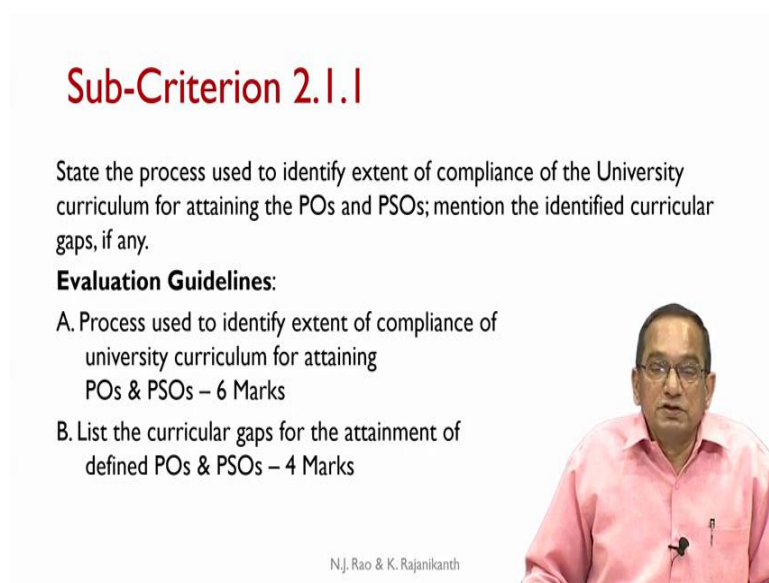
So, the department must have a process to identify the extent of complains of the university curriculum for attaining the POs and PSOs. The department must note if there are any curricular gaps if the curriculum provided by the university is not effectively addressing certain POs the department must make note of those POs and that becomes the bases for

identifying the curricular gaps. There are 10 marks for this sub-criteria, if the departments finds that there are curricular gaps then it must organize delivery of content beyond the syllabus to help the attainment of POs and PSOs which are weekly addressed by curriculum.

So, straight the delivery details of the content beyond the syllabus for the attainment of POs and PSOs, this sub-criterion carries 10 marks, so the total would be 20 marks. NBA states that if the POs and PSOs are being demonstrably met through the university curriculum, then 2.1.2 will not be applicable and the weightage of 2.1.1 will be 20 the total marks for this sub-criterion.

However, it is very rare to find the university curriculum that can effectively meet the requirements of all the POs. Most of the cases, the department would be finding certain curricular gaps. However, in case the university curriculum is able to effectively address all the POs and PSOs and if the demonstrations by the departments is satisfactory, then 2.1.2 would not be relevant.

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**Sub-Criterion 2.1.1**

State the process used to identify extent of compliance of the University curriculum for attaining the POs and PSOs; mention the identified curricular gaps, if any.

**Evaluation Guidelines:**

- A. Process used to identify extent of compliance of university curriculum for attaining POs & PSOs – 6 Marks
- B. List the curricular gaps for the attainment of defined POs & PSOs – 4 Marks

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So, the sub-criterion 2.1.1 requires the department to state the process used to identify the extent of compliance of the university curriculum for attaining the POs and PSOs. The process of determining the extent to which the university curriculum addresses POs and PSOs effectively can be quite similar to the process followed by a tier one institute.


Create the program articulation matrix look at each individual column to see the extent to which curriculum is able to address that particular PO. So, the process can be quite similar,

the process which is used for such purposes carries 6 marks. List the curricular gaps for the attainments of defined POs and PSOs this aspect carries 4 marks.

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### Sub-Criterion 2.1.1(2)

- **Exhibits/Context to be Observed/Assessed:**
  - Documentary evidence to indicate the process which ensures mapping/compliance of University Curriculum with the POs & PSOs; Identification of gaps; if any.
  - Effective participation of internal and external department stakeholders with effective process implementation.




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We must have the documentary evidence to indicate the process which ensures the mapping compliance of the university curriculum with the POs and PSOs and if any gaps are identified the department must list those gaps. There must be effective participation of internal and external department stake holders with effective process implementation. The department must have implementation records to show the effective implementation of the process.

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### Sub-Criterion 2.1.1(3)

- The process used to identify extent of compliance of the University curriculum for attaining the POs and PSOs can be quite similar to the one described for Tier I institute.
- Identified curricular gaps, if any, must be listed along with the justifications for the appropriateness of the identified gaps.
- Process document and implementation records must be available.



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The process used to identify the extent of compliance of the university curriculum for attaining the POs and PSOs can be quite similar to the one described for tier one institute as already mentioned. Identified curricular gaps if any must be listed along with the justification for the appropriateness of the identified gaps. The department must provide the reasoning based on which it identifies the curricular gaps and the department must obviously have proper process document and implementation records.

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## Sub-Criterion 2.1.2

State the delivery details of the content beyond the syllabus for the attainment of POs & PSOs.

### Evaluation Guidelines:

- A. Steps taken to get identified gaps included in the curriculum. (e.g. letter to University/BOS) (2 Marks)
- B. Delivery details of content beyond syllabus (5 Marks)
- C. Mapping of content beyond syllabus with the POs & PSOs (3 Marks)

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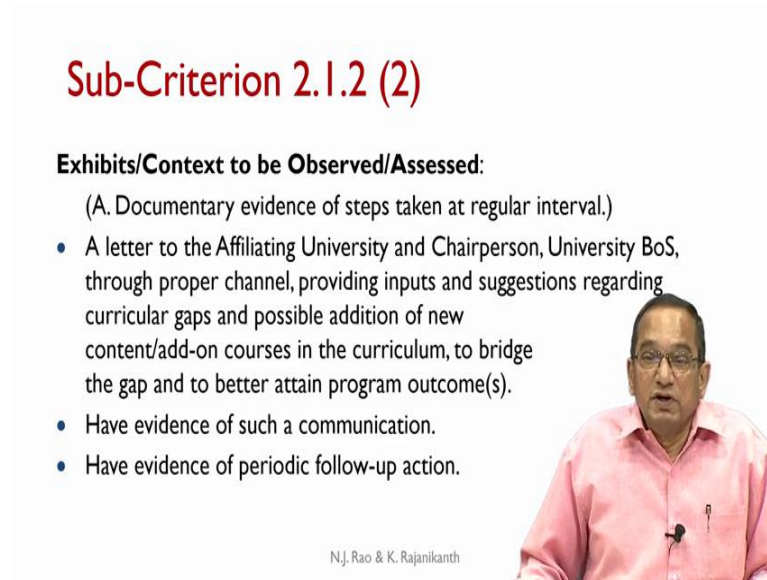
Sub-criterion 2.1.2 requires the department to provide delivery details of the content beyond the syllabus for the attainment of POs and PSOs. If the departments find that there are gaps in the curriculum in terms of its ability to address effectively certain POs and our PSOs, then it must plan delivery of content beyond the curriculum to help the students attain those POs and PSOs.

It must list the details of the delivery of content beyond the curriculum. The evaluation guidelines include an examination of the steps taken by the department to get the identified gaps included in the curriculum. The department must write a letter to appropriate authorities of the university, either the chairperson of board of studies and or (( ))(19:29) of the university indicating the identified curricular gaps and suggesting what additional courses could be included in the curriculum to make effective in terms of addressing all the POs and PSOs.

In fact, if the department can maintain a copy of such a letter written to the university that itself will fetch 2 marks. There are three guidelines, one is the steps taken by the department two is delivery details of content beyond the syllabus and the third is mapping of the content

beyond the syllabus with the POs and PSOs. These three aspect carries 2 marks, 5 marks and 3 marks respectively total of 10 marks.

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**Sub-Criterion 2.1.2 (2)**

**Exhibits/Context to be Observed/Assessed:**

(A. Documentary evidence of steps taken at regular interval.)

- A letter to the Affiliating University and Chairperson, University BoS, through proper channel, providing inputs and suggestions regarding curricular gaps and possible addition of new content/add-on courses in the curriculum, to bridge the gap and to better attain program outcome(s).
- Have evidence of such a communication.
- Have evidence of periodic follow-up action.

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The department must have evidence that it has communicated to the university regarding the identified curricular gaps, So, a letter to affiliating university and chairperson university board of studies through proper channels of course providing inputs and suggestions regarding curricular gaps and possible addition of new content add-on courses in the curriculum to bridge the gap and better attain the program outcomes.

The department must be able to produce evidence of such a communication. It must also have evidence of a periodic follow up action regarding this issue.

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## Sub-Criterion 2.1.2 (3)

### Exhibits/Context to be Observed/Assessed (continued):

- (B. Delivery details of content beyond syllabus.)
  - Documentary evidence of delivery details of content beyond syllabus, year-wise, in the specified format.
- Content beyond syllabus may include additional course / learning material / content / laboratory experiments / projects etc.
- The mapping between additional content and the POs/PSOs addressed by that content must be justifiable.
- It is a good practice to analyze the impact of the additional content delivered.

Delivery details of content beyond the syllabus is the next aspect examined by the comity. Documentary evidence of delivery details of content beyond the syllabus year wise in the specified formats must be provided by the department. For the past three academic years, the department must provide these details.

Content beyond syllabus may include additional course, learning material, content provided to students, laboratory experiments, projects etc. The mapping between the additional content and the POs and PSOs addressed by that content must be justifiable. Why this additional content is being provided? What are the POs or PSOs addressed by this additional content? This details must be provided by the department, it is a good practice to analyse the impact of the additional content deliver.

For example, the department is offering an add-on course in order to address a particular PO, let us say PO seven, then it is worthwhile for the department to do some kind of survey to assess the extent to which that add-on course is enabling the student to attain that particular PO in a better way.



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## Sub-Criterion 2.1.2 (4)

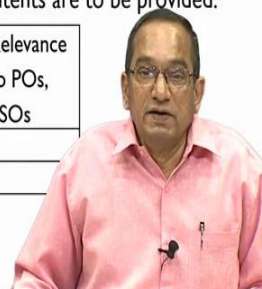
### Exhibits/Context to be Observed/Assessed (continued):

(B. Delivery details of content beyond syllabus.)

- The delivery details must be provided for the past three academic years.
- Format in which delivery details of additional contents are to be provided:

Sl. No.	Gap	Action Taken	Date- Month- Year	Resource Person with Designation	% of Students	Relevance to POs, PSOs

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The delivery details of the content beyond the syllabus must be provided in the format that is indicated in SAR. What is the identified gap? What is the action taken? When was that action taken? The date, month and the year, resource person with designation, who provided this additional content or material? How many students attended this program? As a percentage of total number of students in that class and most importantly what is the relevance to the POs and PSOs? The mapping between the additional content and POs and PSOs must be provided and this mapping must be done with constable care and it must be justifiable.

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## Sub-Criterion 2.1.2 (5)

### Exhibits/Context to be Observed/Assessed (continued):

(C. Mapping of content beyond syllabus with the POs & PSOs.)

- Availability and appropriateness of Mapping table between contents delivered and Program outcomes/ Program specific outcomes (Course outcomes)
- As already noted, the mapping between the additional contents delivered and POs / PSOs must be available and appropriate.

(Note: Departments need to exercise good care in stating these mappings.)

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## Sub-Criterion 2.1.2 (4)

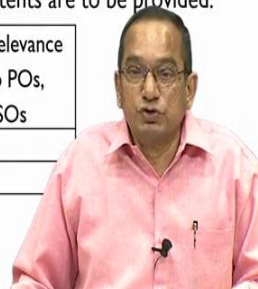
### Exhibits/Context to be Observed/Assessed (continued):

(B. Delivery details of content beyond syllabus.)

- The delivery details must be provided for the past three academic years.
- Format in which delivery details of additional contents are to be provided:

Sl. No.	Gap	Action Taken	Date- Month- Year	Resource Person with Designation	% of Students	Relevance to POs, PSOs

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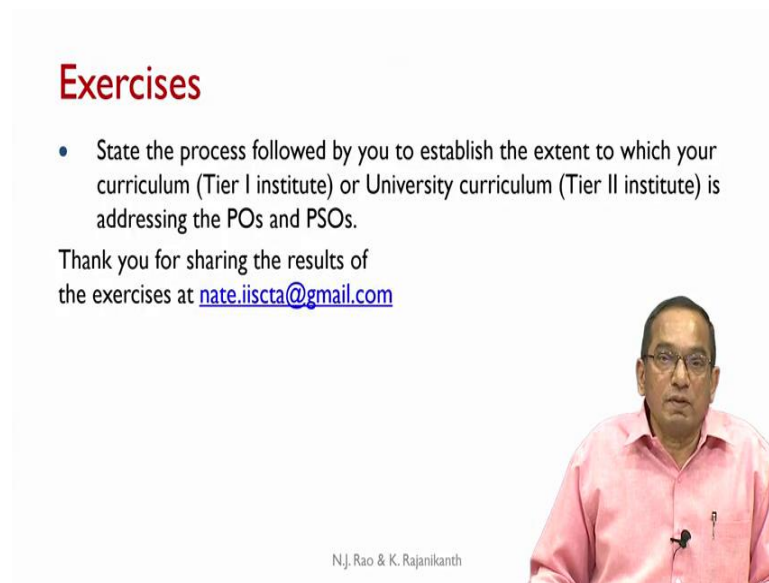


The next aspect is mapping of the content beyond the syllabus with POs and PSOs which we have shown here in this last column. Availability and appropriateness mapping table between contents delivered and POs and PSOs. As already noted, the mapping between the additional content delivered and POs and PSOs must be available and appropriate. Many departments do initiate and execute a large number of activity in this direction to address the curricular gaps.

However, the departments need to exercise good care in stating the mappings, often the content which is delivered may not be really relevant to the PO or PSO which is listed in the table here. For example, a department organizes a purely technical course to address some of the latest developments in this specific domain and the mapping is to some criteria like environment.

Well, the content may really address that particular PO, but quite often it does not have any relationship to that particular PO. The departments are sometimes causal in entering the relevant POs and PSOs that would not be a proper way of completing this table. The department must ensure that the mapping is proper, appropriate and justifiable.

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**Exercises**

- State the process followed by you to establish the extent to which your curriculum (Tier I institute) or University curriculum (Tier II institute) is addressing the POs and PSOs.

Thank you for sharing the results of the exercises at [nate.iiscta@gmail.com](mailto:nate.iiscta@gmail.com)

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An exercise for you, state the process followed by you to establish the extent to which your curriculum if you are in a tier one institute or the university curriculum if you are in a tier two institute is addressing the POs and PSOs. Thank you for sharing the results of the exercise at [nate.iiscta@gmail.com](mailto:nate.iiscta@gmail.com).

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**M3 U12**

- Understand the SAR requirements related to the Teaching-Learning Processes.

(Criterion 2 of SAR: Program Curriculum, Teaching-Learning Processes – Sub-Criteria 2.2: Teaching-Learning Processes.)

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In the next unit, we will understand the SAR requirements related to the Teaching-Learning process. This is Sub-criterion 2.2 of the SAR which is broadly the program curriculum teaching learning process. Thank you we will meet in the next unit. Thank you.