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### 1. General observations:

For the purposes of analysis, a training program consists of 5 curricular categories: mathematics, natural sciences, engineering sciences, engineering design and complementary studies.

To assess the academic effort in these categories, the AU, Accreditation Units are used.


Mathematics: Corresponds to the contents of linear algebra, differential and integral calculus, differential equations, probability and statistics and numerical analysis.

Natural Sciences: Corresponds to the scientific disciplines that are dedicated to the study of nature. They take care of the physical aspects of reality. They rely on logical reasoning and the methodological mechanism of the formal sciences, especially mathematics and logic, whose relation to the reality of nature is indirect. It includes Chemistry, Physics, Biology and Geology.

Engineering Sciences: The contents of the engineering sciences have their foundations in mathematics and natural sciences but are focused on creative applications. They involve the use of mathematical techniques or numerical analysis, as well as simulation, the creation of models or experimental methods. Emphasis is placed on the identification and solution of practical engineering problems.

Engineering Design: Engineering design integrates the knowledge of mathematics, basic sciences, engineering sciences and complementary studies in the development of elements, systems and processes to meet specific needs. It is a creative,

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iterative and often "open-ended" process, subject to the constraints of technical norms, economic aspects, social aspects, legal, environmental, safety and occupational health or interdisciplinary aspects.

Complementary Studies: Includes the contents that make possible an integral formation and that complement the studies of technical nature of the curriculum. Themes and topics on humanities, social sciences, administration, impact of technology on society and the environment, sustainable development, professional ethics, leadership, teamwork, occupational health, oral and written communication are included in this category.


## 2. Purpose of the guide:

Establish the minimum elements that allow the calculation of the Accreditation Units of an engineering training program.

## 3. The general criteria for calculating the accreditation units:

- a. Only formative activities that grant academic credits are contemplated.
- b. The time contemplated in the calculation of the AUs corresponds to the real time of interaction between the teacher and the student.
- c. One classroom hour (50 minutes of activity) provides an AU.
- d. If it is a practical activity (laboratory, workshop, tutorial or practice work, one hour (60 minutes of activity) contributes 0.5 AU.

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e. The classes or lessons that are not of the nominal duration of 50 minutes, their calculation is modified proportionally to their effective duration.

f. For an activity in which hours of teacher-student interaction cannot be used, to fully describe the scope of the work it represents, such as important design or research projects or similar works officially recognized by the institution as requirements for the achievement of the title, the institution must employ an equivalent measure in accreditation units.

g. To determine this equivalence, the definition of academic credit, accepted by the competent entities (CONARE AND CONESUP), applied by the institution to those activities, is used.

h. A K factor can be calculated to transform these credits into accreditation units (AU), making the following division:

$\sum AU$  (for all courses of common and compulsory core of the program for which the hourly calculation was made).


$$K = \frac{\sum AU}{\sum \text{Academic credits defined by the institution for the same courses}}$$

$\sum$  Academic credits defined by the institution for the same courses

i. Only activities and contents that are the object of study at the university level are considered.

j. The preparatory or leveling subjects with pre-university study contents will not be considered in the calculation of


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the AUs. Such is the case of mathematics with pre-calculus contents.

- k. An academic cycle (regardless whether the name is a quarter, semester or semester), has a minimum duration of 15 weeks.
- l. For any subject, it is considered as maximum that it has contents in 3 curricular areas.
- m. The relative percentage of each of these contents should not be less than 25% of the total.
- n. If less than 25% of the elements of a curricular area are present in a subject, they will not be considered in the total calculation of the AUs of that category.
- o. The "minimum route" of training should be considered for calculation. That is, the total sum of subjects of the training process to be considered will be one that is defined by the smallest number of subjects, with the lowest number of AUs necessary for that a person has completed his training process, regardless of whether the program has more subjects.
- p. For example, if a program has 6 optional subjects and to obtain the graduate status only 2 of these subjects are required, only the 2 optional subjects that provide the least number of AUs will be considered.
- q. For the calculation of the AUs in the curricular areas of mathematics and natural sciences, only the subjects of these areas from the first years of training are considered.
- r. If in higher courses elements of mathematics and natural sciences are present, these will be considered only if they are novel, they have not been previously addressed in initial subjects, and they represent more than 25% of the total.

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#### **4. Actions prior to the visit:**

- a. The program specialist must verify the AU calculation made by the program in the self-assessment document.
- b. If the information reported reveals a deviation from the general criteria mentioned above, it should be indicated as a possible "weak link", which must be verified.
- c. You must inform the team leader of the findings.

#### **5. Actions during the visit:**

- a. Interviews with the program management and with the teachers should be used to extract evidence about the AUs calculation.
- b. The procedure for the calculation of the AUs carried out by the program should be identified
- c. The participation of teachers from the different subjects must be verified.
- d. If the evaluation includes several programs and these show differences in the calculation of the AUs, of common courses (common core), the causes must be investigated.
- e. If there are discrepancies in the calculation of the AUs, of any category between the evaluator and that reported by the program, the reasons for these differences must be explicitly indicated in the specialist's evaluation report.

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**6. Actions after the visit:**

- a. Consolidate with the head of the evaluation team, the report of the calculation of the AUs, and the discrepancies, if any.

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